ELECTRICAL REVIEW

May 2, 1947

Managing Editor :
Hugh S. Pocock, M.I.E.E.

Technical Editor :
C. O. Brettelle, M.I.E.E.

Industrial Editor :
J. H. Cosens

Contents :—

	Page
EDITORIAL—The Fair and the Future	689
BRITISH INDUSTRIES FAIR—	
Plan of Section "C" at Birmingham	697
List of Electrical Exhibitors	698
Exhibits at Birmingham	701
The London Section	717
ARTICLES—	
Overseas Electrical Trade	691
Metallurgy and Electricity. By L. Sanderson	725
REPORTS—	
Marconi Jubilee	692
Electricity Bill	694
B.E.A.M.A. Annual Meeting	721
Fuse Specifications	728
Commissioners' Statistics	734
REPORTS—*continued*—	
Nationalization in France	738
Electricity in the Home	738
NEWS SECTIONS— Parliamentary, 693 ; Personal and Social, 695 ; Commerce and Industry, 729 ; Electricity Supply, 733 ; Financial, 735 ; Contracts, 739.	
NEW BOOKS	722
VIEWS ON THE NEWS	723
NEW PATENTS	724
CORRESPONDENCE — Engineering Calculations ; Export Trade Methods ; Union and Institution.	727
NEXT WEEK'S EVENTS	740
Classified Advertisements	63
Index to Advertisers	88

EDITORIAL, ADVERTISING & PUBLISHING OFFICES : Dorset House, Stamford St., London, S.E.1

Telegraphic Address : "Elecrev, Sedist, London." Code : ABC. Telephone No. : Waterloo 3333 (50 lines).

Registered at G.P.O. as a Newspaper and Canadian Magazine rate of postage. Entered as Second Class Matter at the New York, U.S.A., Post Office.

Annual Subscription, Post free : Great Britain and elsewhere (except Canada), £2 7s. 8d. ; Canada, £2 3s. 4d.

Cheques and Postal Orders (on Chief Office, London) to be made payable to ELECTRICAL REVIEW LTD., and crossed "Lloyds Bank."

Lift it by
KING

The King Electric Chain Pulley Blocks are built for continuous heavy duty. Three models are available : Minor, Major, and Mammoth, ranging in capacity from 5 cwts. to 10 tons

SEE OUR STAND No. D404, B.I.F. BIRMINGHAM, MAY 5—16

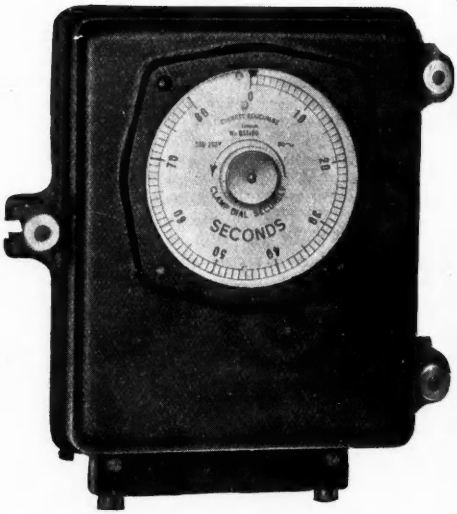
GEO. W. KING LTD.

Makers of Electric Pulley Blocks, Cranes and Conveyors. Write for illustrated booklets

P.B.Y. WORKS, HITCHIN

SYNCLOCK PROCESS TIMERS AND CONTACTORS

for accurate timing of industrial and scientific processes.



- The Synclock Synchronous Self-Starting motor ensures accurate timing and repetition when connected to a time controlled alternating current supply.
- Wide range of full scale settings are available in Seconds, Minutes or Hours.
- Unelapsed time is always visible.
- External time adjustments can be provided when required.
- Contacts (normally open or closed) reset automatically for next operation.

Write for Catalogue Sheet 611

EVERETT EDGCUMBE
COLINDALE WORKS
LONDON, N.W.9
Telephone : COLINDALE 6045

Manufacturers of all kinds of indicating and recording electrical instruments. Photometry experts

ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXL. No. 3623 MAY 2, 1947 9d. WEEKLY

The Fair and the Future

British Determination Demonstrated

WHATEVER may be the present ability of British manufacturers to supply goods within a reasonable period, the British Industries Fair demonstrates their craftsmanship, versatility and ingenuity, three of the qualities recognized as necessary in the rebuilding of our export trade. It is also a sign of their alertness and faith in the future that there are so many more of them this year than in the last (pre-war) Fair.

There have been suggestions that the revival of the Fair this year was a mistake: that manufacturers are already overwhelmed with orders with which they find it difficult to cope, or that if they had the orders could not get the necessary labour and materials to execute them.

Home and Export Trade

These unfortunately are too frequently the facts of the case but the outlook is not so drear that nothing can be done. So far as the electrical industry is concerned the high level of export business indicates that in this section, at least, difficulties are being overcome. It may be said that the home market is being starved to do it, but, that again is not wholly true. Manufacturers find it necessary to maintain a balance between home and export production and on the whole they are doing it very well. It is the Government's policy (and a pressing necessity) to stimulate overseas trade and for this purpose allocation of material is more generous where orders for export are concerned.

Much of this exposition may seem to support those who proclaim the unwisdom of holding a British Industries Fair this year. But we cannot live entirely in the present and tell prospective customers that we are too busy or totally unable to attend to them. Although Germany and Japan are temporarily out of the struggle this is still a competitive world and other nations are making themselves heard. They cannot, any more than ourselves, promise immediate delivery of all that is demanded but they are "showing the flag" and it would be suicidal for this country to treat foreign buyers as the British grocer too often treats the home consumer.

Repairing Wartime Dislocation

Great Britain has no need to apologize or feel frustrated. The effects of six years of total war are not overcome in two years. Despite the continual moans of the professional pessimists we are recovering and will continue upward. Our overseas friends realize the position and if we show that we are doing our best to meet their requirements will exercise the necessary patience and forbearance.

At the recent annual meeting of the British Electrical and Allied Manufacturers' Association Mr. E. C. Holroyde said that he saw no reason for lack of confidence in the industrial future of this country and that, given the necessary leadership by our Government and industrialists, we should regain a condition of national prosperity much more quickly than many people seemed to anticipate.

It is in this light that the British Industries Fair should be regarded. The

display is a conspectus of British productivity. Not all the items can be obtained on demand in the required quantities; delivery periods will vary according to the nature of the products. But they are being made and the examples shown will demonstrate to overseas buyers the range of British industry, the quality of its work and its adaptability to modern needs. And this applies especially to the electrical manufacturers who are well represented at the Fair.

Fuel Saving

MR. SHINWELL'S statement in the House of Commons last week on the methods proposed for securing fuel economy was something of an anti-climax in the atmosphere which has been created in the past few weeks. Nevertheless the restrictions which are to be imposed, coupled with an appeal to the public's common sense, are the most that can be done in a democratic state and the electrical industry will heartily co-operate in the campaign. It is at least comforting to know that the Ministry of Fuel has realized the impossibility of rationing gas and electricity and that the two services are to be treated on equal terms after some weeks of discrimination against electricity.

Bankside Dispute

PROTESTS against the erection of a new station on its Bankside (Southwark) site by the City of London Electric Lighting Co. continue. The consent of the Minister of Town and Country Planning to the building of the station was conditional upon the use of oil fuel and the setting back of the station from the Thames to give room for a proposed roadway and promenade. Many of the opponents of the plan appear to regard the consent as provisional and possibly revocable but Mr. Silkin has given no hint of this, his view being that the use of the alternative site at Rotherhithe would delay the provision of much-needed electricity by two years. Is it impossible to reconcile this conflict between the advocates of amenity and utility without inordinate delay?

Electron Jubilee

WEDNESDAY of this week was the anniversary of the first public announcement of the existence of the electron, when Sir Joseph Thomson demonstrated that cathode rays consisted of negatively charged particles smaller than the hydrogen atom, hitherto the smallest known, and estimated their approximate weight. Arrangements are being made by the Institute of Physics and the Physical Society in collaboration with the Institution of Electrical Engineers to celebrate this jubilee on September 25th and 26th. These will include the opening of an exhibition at the Science Museum relating to the results of the discovery. Thomson's contribution, however, was much more than the original discovery. It was followed by twenty years of research and by the training of his successors in working out the implications of the electronic theory.

Kelvin Lecture

ONE of the most significant features of the fifty years' survey of progress in fundamental research into electrical discharge through gases, which was presented by Professor L. B. Loeb in the thirty-eighth Kelvin Lecture, was the indication it gave of the number of questions the subject raises that still remain unanswered. Indeed it would appear that as further knowledge is gained, so these questions multiply. That brings a challenge to electrical engineers to turn to utility the rich material placed at their disposal by physicists, as they have done, for instance, in developing the electric discharge lamps that for nearly fifteen years have been illuminating the streets.

Harmonics from Rectifiers

RAILWAY electrical engineers who took part in the discussion at Rugby on Dr. J. C. Read's paper (summarized in our last issue) appeared to be fully appreciative of the practical merits in suitable circumstances of his phase-doubled 12-phase connection, which obtains virtual sine-wave characteristics from rectifiers. The main scope for this connection probably lies in main-line electrification in which rectifiers in traction substations are likely to cause serious harmonics in a.c. transmission lines but have output ratings and loading conditions which are too small to justify the installation of normal 24-phase conversion equipment. An attractive feature of the method described is that phase-doubling need not be introduced until its desirability has been demonstrated in operation.

Overseas Electrical Trade

March Exports Well Maintained

IT may be that the partial stoppage of industry in February has not yet had its full effect. Anyhow exports of electrical equipment in March, valued at £5,305,000, remained above the monthly average for the preceding year (£4,690,000). But the figures which we reproduce from the Board of Trade returns make it clear that this satisfactory showing was due to a large advance in the value of exports of machinery (including transformers and heavy switchgear) which reached the record level of £1,947,037. The previous highest figure was £1,842,260 in May last year. Goods and apparatus exports remained at about the average.

Examination of the machinery export analysis reveals that generators and parts constituted less than a third of the total and parts accounted for almost 40 per cent of these exports. On the other hand, convertors, transformers, switchgear, etc., formed well over half of the total and motors about a fifth; the substantial rise in machinery shipments as compared with March last year was due to these two classes. British India and Russia took the largest proportions of

Table I.—Electrical Exports and Imports

Class	Exports			Imports		
	March, 1947	March, 1946	Monthly Av., 1938	March, 1947	March, 1946	Monthly Av., 1938
	£	£	£	£	£	£
Telegraph and telephone wires and cables, submarine	111,210	125,984	17,289			
Ditto, not submarine	113,521	169,287	71,803			
Wires and cables, other than telegraph and telephone, rubber insulated	321,875	230,368	117,533	3,140	1,374	31,246
Ditto, insulation other than rubber	293,455	492,260	153,256			
Commercial radio apparatus	99,557	52,884	28,296	2,857	*	*
Domestic radio receivers	364,754	129,651	36,755	6,145	11,472	10,148
Telegraph,telephone and signalling apparatus	† 437,437	507,369	242,716	16,219	13,925	9,243
Other radio, etc., apparatus	206,058	88,841	57,848	13,371	1,831	47,870
Valves	147,159	83,537	41,272	15,478	2,729	10,893
Electric carbons, furnace	*	*	*	11,762	—	4,054
Other electric carbons	*	*	*	3,941	2,864	2,301
Electric lamps	114,220	123,082	49,440	3,636	1,475	10,265
Other lighting apparatus	213,303	130,525	48,565	2,774	849	38,662
Primary batteries	29,955	54,634	13,572	277	123	3,549
Accumulators, portable	117,634	101,796	28,874	*	*	*
Ditto, stationary	17,358	13,188	19,773	*	*	*
Ditto, parts and accessories	38,374	38,445	—	*	*	*
Electric cooking and heating apparatus	208,792	92,007	30,664	*	*	*
Commercial electrical instruments, including ammeters, voltmeters, etc., and parts	76,768	41,816	15,878			
House service meters	65,282	38,605	15,791	13,790	3,185	32,057
Other electrical instruments	36,108	22,823	9,612			
Electro-medical apparatus, other than X-ray	25,996	11,784	3,038	*	*	*
X-ray apparatus, vacuum tubes and parts	44,035	22,481	4,881	12,996	37,030	9,734
Insulating materials, not elsewhere specified	97,998	83,189	19,343	*	*	*
Unclassified electrical goods and apparatus	177,123	215,830	108,083	20,134	6,691	52,980
Generators, complete, up to 200 kW	128,422	36,233	38,071	*	*	*
Ditto, over 200 kW	166,524	384,697	119,079	*	*	*
Ditto, parts	199,830	16,482	—	*	*	*
Railway and tramway motors	56,361	22,076	15,977			
Other motors up to ½ H.P.	26,111	11,316	9,001			
Ditto, over ½ H.P. but under 1 H.P.	16,853	12,377	2,470	6,272	6,292	40,488
Ditto, 1-250 H.P.	204,650	147,041	96,637			
Ditto, over 250 H.P.	17,115	14,629	20,960			
Converting machinery	18,103	1,624	101,304	*	*	*
Transformers, including coils	288,562	212,599				
Rectifiers for power-house use	21,627	6,565	3,463	*	*	*
Motor starting and controlling gear	80,654	64,178	50,866	*	*	*
Switchgear and switchboards, other than telegraph or telephone	485,504	176,066	184,533	*	*	*
Other electrical machinery	18,462	18,373	15,497	*	*	*
Electric vacuum cleaners and parts	199,522	67,276	26,662	*	*	*
Other electrically-operated portable appliances	18,737	35,295	10,394	9,985	2,453	24,627
Total	5,305,009	4,097,213	1,829,196	142,777	92,293	328,117

* Not classified separately. † The figures for 1947 are not completely comparable with those of previous years.

the generating plant and India was also the largest buyer of motors. Russia took about half of the rest of the exported machinery.

As regards electrical goods and apparatus, there was a substantial fall in the cable class as a whole compared with March last year, redeemed only by an increase in shipments of rubber-insulated cables for which British India was responsible. South Africa and New Zealand continued to be large customers for cables.

Table II.—Distribution of Exports of Electrical Goods and Apparatus

Destination	March, 1947	March, 1946	Monthly Av., 1938
	£	£	£
Eire	101,250	116,870	37,726
Channel Islands	38,251	23,739	12,177
Palestine	46,983	49,691	8,426
British West Africa	37,977	38,790	12,889
Union of South Africa	419,256	389,168	162,584
Southern Rhodesia	26,397	28,719	9,632
British East Africa	20,032	64,257	7,893
British India	563,146	278,589	123,789
Burma	21,809	10,757	5,337
British Malaya	114,376	33,637	32,792
Ceylon	26,662	26,846	15,048
Hong Kong	37,692	10,923	12,939
Australia	149,567	346,374	197,366
New Zealand	165,743	163,837	96,225
Canada	28,899	12,194	12,547
British West Indies	59,473	19,280	12,954
Other British Countries	108,009	76,963	21,265
Soviet Union	48,787	—	36,781
Finland	18,875	48,176	5,969
Sweden	63,376	39,226	14,948
Norway	57,116	89,073	12,881
Iceland	28,700	46,562	2,796
Denmark	69,955	56,633	18,907
Poland	23,194	335	9,702
Netherlands	81,559	78,672	22,010
Belgium	79,327	59,693	11,208
France	89,214	130,799	16,082
Switzerland	27,984	10,805	3,768
Portugal	63,304	148,696	6,512
Spain	20,560	24,127	3,813
Czechoslovakia	44,873	1,686	7,256
Yugoslavia	23,962	4,365	1,475
Greece	42,110	1,346	4,926
Turkey	31,230	61,451	7,684
Portuguese East Africa	5,239	14,341	6,942
Egypt	60,856	65,155	13,176
Iraq	52,042	28,142	5,530
Iran	85,819	71,970	16,345
China	61,161	11,267	4,119
United States of America	15,236	6,899	5,839
Mexico	11,892	21,330	1,466
Venezuela	20,736	16,759	2,936
Chile	9,057	1,714	6,635
Brazil	84,993	20,047	11,164
Argentine Republic	78,316	67,830	45,452
Other Foreign Countries	92,977	52,653	46,371
Total	3,357,972	2,870,386	1,134,282

Radio equipment was again well up in comparison with March last year and here, too, British India (£101,575) was the main buyer, with South Africa, Brazil and Iran showing large increases. The total value of telegraph and telephone equipment declined, largely on account of smaller purchases by South Africa, Australia and Portugal, but Argentina's share was considerably greater.

Exports of lighting equipment (other than lamps) were considerably higher, South Africa and India being the principal markets. There were marked rises in exports of heating and cooking apparatus and of instruments.

It will be seen from Table II that for electrical goods and apparatus as a whole British India headed the list (£563,146) followed by South Africa (£419,256). Rather a long way behind came New Zealand (£165,743), Australia (£149,567), British Malaya (£114,376) and Eire (£101,250). The principal foreign buyers were France (£89,214), Iran (£85,819), Brazil (£84,993), the Netherlands (£81,559), Belgium (£79,327) and Argentina (£78,316.)

Electrical imports rose substantially above the March, 1946, level but were still considerably below the 1938 monthly average. Radio equipment, meters and instruments, and X-ray apparatus, etc., were the main items.

Marconi Jubilee

WIRELESS telegraphy celebrates its fiftieth anniversary this year and a Marconi Jubilee Exhibition, arranged by Marconi's Wireless Telegraph Co., Ltd., opened on April 23rd at Queen's House, Kingsway, London, W.C.2, at which are shown the developments of Marconi's invention from the first crude apparatus with a range of a few miles to the most modern equipment now in world-wide use. The exhibition closes to-day (Friday).

In 1897 the Wireless Telegraph & Signal Co., Ltd., was formed to acquire the Marconi patents and to develop them commercially. Three years later the name was changed to Marconi's Wireless Telegraph Co., Ltd., and in the same year the Marconi International Marine Communication Co., Ltd., was formed to develop the use of wireless at sea. The Marconi Co. and its associated companies now form part of the English Electric group of companies under the chairmanship of Sir George Nelson.

A convention of fifty delegates from thirty countries is being held in London from April 28th to May 7th, a special display is being arranged on the Marconi stand at the British Industries Fair at Olympia, and representatives and agents of the company throughout the world have been invited to attend the jubilee convention which was opened by Sir George Nelson at a luncheon at Grosvenor House Hotel.

Convention headquarters are at the South Kensington Hotel and, in addition to conferences which are being held there, the delegates are to visit all the principal research, development and industrial establishments of the Marconi and English Electric Companies at Chelmsford, Great Baddow, St. Albans and Stafford.

PARLIAMENTARY NEWS

By Our Special Reporter

WHEN the Budget resolutions were considered on report, there was criticism of the resolution reimposing the purchase tax on certain electrical and gas appliances used in the home.

Mr. Bramall said that a cooking stove was by no means a luxury. He referred particularly to the case of people who, after long waiting, had at last managed to obtain a house only to find that they were now subjected to a quite arbitrary tax in the shape of extra payment for their cooking stove. There was also the case of the bombed-out, and he said that this increase in the purchase tax did seem very unfair and would do nothing to diminish consumption.

Many other members supported this view, but Mr. W. G. Hall, the Financial Secretary to the Treasury, said that it had to be admitted that during the last eighteen months or two year the sale of these appliances had gone up by leaps and bounds and had been one of the causes of our difficulties during the last winter. The purpose of the reimposition of the tax, therefore, was not to obtain revenue but, principally, to slow down the use of these appliances until more plant was available.

Bankside Power Station

Mr. Silkin, Minister of Town and Country Planning, told Mr. Keeling that the Government had decided to permit the erection of a new power station at Bankside (Southwark), opposite St. Paul's Cathedral, provided that the electricity was generated by oil and that the building was set back from the river to allow the proposed road and promenade along the front. The Royal Fine Art Commission would be consulted on the design of the building. It was not agreed that the historic dominance of St. Paul's would be threatened. An alternative site at Rotherhithe, submitted by the London County Council, was rejected because it would take at least two winters longer than the other before electricity could be provided.

Expediting Plant Production

Mr. John Wilmot, Minister of Supply, replying to Mr. Ellis Smith, said that as a result of meetings of the Heavy Electrical Plant Committee held under his chairmanship a progressing organisation had been set up to help electrical plant manufacturers to overcome production difficulties. The highest priority was being given to the supply of labour and essential materials needed for manufacturing installations and the repair of plant. Arrangements had been made to ensure that export orders did not interfere with home requirements. Every effort was being made to speed up the programme to the maximum extent.

Answering a further question, Mr. Wilmot said he would be willing to consider bringing in German and Italian engineers to make a contribution to the economic rehabilitation of Britain.

Fuel Restrictions

On April 24th Mr. Shinwell announced in the House of Commons that the Government aimed at securing a saving of 2½ million tons of coal during the summer by restricted domestic use of gas and electricity. After consulting the gas and electricity industries, employers' and employees' organizations and women's organizations he had decided to prohibit space heating by gas and electricity in both industrial and domestic establishments during the summer months. The ban on industrial and commercial establishments would run from May 5th to the end of October and that on domestic premises from May 5th to the end of September.

In addition it was proposed to ask domestic consumers to endeavour to cut down their consumption during the summer by 25 per cent as compared with last year. In this they had been promised full support by the gas and electricity industries and women's organizations.

Street Lighting Economy

Mr. Gammans asked the Minister of Fuel and Power what was the estimated saving in coal in the month of March effected by the restrictions on street lighting.

Mr. Shinwell said that it was impossible to give an exact figure, but as a very rough estimate coal consumption was 30,000 tons less than the average monthly rate in 1946.

Power Plant from Germany

Mr. Prescott asked whether consideration had been given to the importation of electric power station equipment from Germany.

Mr. Shinwell said that an interim report of the special mission which recently visited Germany to inspect power station plant had now been received and was being examined.

Menai Straits Scheme

Mr. Price-White asked the Minister of Fuel and Power whether it was his intention now, or at some future date, to put into operation the scheme prepared and submitted by Mr. F. O. Harber, borough electrical engineer of Bangor, for harnessing the waters of the Menai Straits.

Mr. Shinwell said that the merits of the scheme could not be determined without a detailed survey and the construction of a tidal model. Capacity for the construction of such models was limited and was being reserved for the tidal model for the Severn Barrage Scheme.

Electricity Bill

Directors' Liability. Price-Dividend Sliding Scales.

ON further consideration of the Electricity Bill in Standing Committee E of the House of Commons last week, Col. Crosthwaite-Eyre moved an amendment to Clause 22 (Control of Dividends and Interest and Safeguarding of Assets Pending Transfer) to delete the liability of directors for any excess of interest or dividend paid for the year before the companies were taken over by the Central Authority.

Mr. Shinwell said that the honest director had nothing to fear from the law. Members of the Opposition seemed to be under the impression that the Government had inserted these provisions in the Bill because they wanted, to put it bluntly, to have a slap at directors. The Government had no such thought in their minds. It had been made quite clear that they had no undue suspicions of directors as a class, but they were anxious to ensure—and they were entitled to the safeguard—that directors did not waste the substance of the undertakings over which they had control before the vesting date. If certain instances were cited the Government might be prepared to modify the provision.

The amendment was, by leave, withdrawn.

Mr. Raikes moved an amendment with the object, he said, of protecting companies which were working on a sliding scale, such as the power companies and the London companies. The Bill repealed the power of the Minister to revise the sliding scale scheme under Section 2 of the 1922 Act—something which the Minister apparently did not realize at the time of the second reading. The amendment suggested that this control should be permitted to continue to operate instead of applying a new control.

Three Different Classes

Mr. Gaitskell, the Parliamentary Secretary to the Ministry of Fuel and Power, said that the amendment involved discrimination between different companies. There were three different classes. First, there were the London companies which, he agreed, were subject to a price-dividend sliding scale which was to some degree effective. Secondly, there were the individual power company Acts where a price-dividend sliding scale was, in the opinion of the Government, quite ineffective because the standard price to which the standard dividend was related was so high in relation to the actual prices that, in effect, the maximum dividend simply did not mean anything and the limitation did not become operative. Then there were the cases under the 1926 Act where the Commissioners had had power to fix a standard price so that there was a relation between these prices and the divisible profits. But he understood that they had in no case fixed a standard price, so that, although in a sense they came under an enactment, there was no maximum dividend in these cases. Was it not clear that if they were to adopt the amendment it would certainly enable the power companies who were covered by their own legislation to pay at the full amount, and the maximum price was so high that it was quite inappropriate in ordinary circumstances? There would be no limitation at all. On the other hand, as he read it, the companies who would be affected by the 1926 Act would be able to claim no benefit from this, and they would be tied down to the maxima laid down in the Bill as it at present stood. He could not see anything fair in that. It seemed to the Government to be reasonable to take the 1945 rate, with the proviso that they could go up to 4 per cent. They could not agree to discriminate in the way suggested.

A "Parliamentary Bargain"

Mr. Foster supported the amendment because the sliding scale was the Parliamentary bargain made with these companies, and it was right that a Parliamentary control, which said that higher dividends could be paid when the company had a good record and lower dividends when the company did not do so well, should remain.

Sir Arnold Gridley said he thought that the amendment was one which ought to be accepted so far as the London companies were concerned. Although he was a director of one of the power companies, he was not so much impressed with the position of the power companies. Most of the Acts were passed many years ago, and the sliding scales were introduced by Parliament. But he was bound to admit, in common fairness, that circumstances had substantially altered since then.

Mr. Gaitskell said that the Government could not accept the amendment, even if it were confined to the London companies and it was negatived by 24 votes to 12.

A further amendment to provide that the undistributed revenue of electricity companies should be added to the net revenue for the financial year for the purpose of payment to the stockholders, was resisted by Mr. W. G. Hall. Mr. Walter Elliot urged that the Minister of Fuel should stand up to the Chancellor of the Exchequer. The message going from that committee to the directors of every company—whether being nationalized or not—was that they should raise their stock exchange quotations by every means in their power, and anything which was not distributed was liable to be confiscated.

Mr. Shinwell said that Mr. Elliot's statements were irrelevant and the amendment was withdrawn.

PERSONAL and SOCIAL

News of Men and Women of the Industry

AT a meeting of the Institution of Electrical Engineers on April 24th **Professor L. B. Loeb**, Professor of Physics in the University of California, delivered the thirty-eighth Kelvin Lecture, the subject being "Electrical Discharge through Gases." Before the lecture the president (Mr. V. Z. de Ferranti) presented **Sir John Kennedy** with the certificate of honorary membership and **Sir Leonard Pearce** with the Faraday Medal.

Mr. F. E. Rawson, latterly superintendent of motor and generator factories, B.T.H. Co., Rugby, has been appointed general manager of Associated Electrical Industries Manufacturing Co., Ltd., India. He is succeeded at Rugby by **Mr. H. J. Timms.**

Mr. J. H. Cotton, M.B.E., has been appointed to the board of the Dubilier Condenser Co. (1925), Ltd., in the capacity of works director. Mr. Cotton received his education and technical training in the United States. He has had wide experience in the design, development and manufacture of capacitors and resistors in both the United States and this country since 1928. He joined the Dubilier organization in 1930 and has held the successive positions of production manager and works manager. He has served on several Government missions to the Continent and the United States during and since the war.

Mr. J. H. Cotton

The Westinghouse Brake & Signal Co., Ltd., announces the following appointments:—**Major L. H. Peter,** M.C., M.I.E.E., to be chief development engineer, **Mr. L. E. Thompson,** B.Sc., A.R.C.S., chief electrical engineer, **Mr. K. H. Leech,** B.Sc., chief design engineer, and **Mr. N. G. Cadman,** chief brake engineer.

Mr. L. H. Crowther, A.M.I.E.E., who recently retired from the position of chief electrical engineer to the English Steel Corporation, Ltd., after forty-one years' service with the company, was educated at Batley Grammar School and the Yorkshire College, Leeds. He was apprenticed to F. W. Dickinson & Co., electrical and mechanical engineers, Leeds, subsequently holding positions with Wilson Hartnell & Co, Taylor Bros. & Co., Leeds (assistant electrical engineer) and the Hull Corporation Electricity Department (engineer-in-charge, Sculcoates Lane power station). In 1906 he took up the post of deputy chief electrical engineer to Cammell Laird & Co., Ltd., Sheffield, and was appointed to his recent position in 1931, being responsible for the electrical equipment of the Sheffield and Manchester Works and also of Darlington Forge, Ltd. He has been an active member of the Sheffield Sub-Centre of the I.E.E. for twenty-six years and was chairman in 1931. His colleagues recently presented him with a wristlet watch. Mr. Crowther's successor, **Mr. J. R. Phillips,** M.A., A.M.I.E.E., was chief electrical engineer at Hadfield's East Hecla Works before taking up his present appointment.

Mr. L. H. Crowther

Mr. F. W. Martin, joint managing director of Tube Products, Ltd., and a director of other Tube Investments companies, was to leave England by air yesterday for Australia and New Zealand on a business visit. He expects to stay for about a month in each country.

Mr. W. A. Turner has resigned the position of senior assistant in the electrical engineering department of the Burnley Municipal College, to take up a similar post at the Northampton Polytechnic, London.

Mr. C. R. Balch has been appointed manager of the Cardiff plant sales division of Crompton Parkinson, Ltd., as from May 1st. He succeeds **Mr. D. Nield,** who has retired but is remaining temporarily in a consultative capacity. Mr. Balch was the Crompton Parkinson representative in Wolverhampton.

Mr. J. C. Edwards has been appointed sales manager of Bastian & Allen, Ltd. Mr. Edwards received his education at Manchester Grammar School, the High School of Commerce and the University, Manchester. He then joined the Chloride Electrical Storage Co., Ltd., Clifton Junction, Manchester, as a member of their trainees' scheme. Before going to Bastian & Allen in 1945 he was a supervising contract engineer with W.T. Glover & Co., Ltd.

Mr. J. C. Edwards

Mr. L. Howells, M.I.E.E., general manager of the South Wales Power Co., and **Mr. A. J. Nicholas,** director and general manager of

South Wales Switchgear, Ltd., have been elected members of the South Wales Executive Committee of the Industrial Association of Wales and Monmouthshire, and **Lt. Col. J. Rankin,** North Wales Power Co., Ltd., has been elected to the North Wales Executive Committee.

In connection with the W.E. Highfield Shield Competition held under the auspices of the Association of Supervising Electrical Engineers, the first prize of £5 5s. and the Shield are awarded to **Mr. E. P. Hollis,** Twickenham, for his paper " In Pursuit of Safety," and the second prize of £3 3s. to **Mr. A. Spencer,** Blackburn, for his paper " Electrical Education and Recognition." There was a tie for third place, a prize of £2 2s. being awarded to each of the following:—**Mr. F. T. Bartho,** Oxhey, Herts., for his paper " Some Notes on the Application of Squirrel-cage Motors," and **Mr. M. G. W. Johnson,** Islington, N.1, for his paper " Large Scale Electric Cooking Equipment." The Shield and prizes will be presented to the successful competitors by the president of the Association, Mr. H. Nimmo, at the Association's opening meeting at the Lighting Service Bureau, London, W.C.2, on October 14th.

Mr. B. Calvert, of Sheffield, has been appointed mains superintendent to the Scarborough Corporation.

Sir Claude Gibb, chairman and managing director of C. A. Parsons & Co., Ltd., has been re-elected president of the Institution of Production Engineers (North-Eastern Section).

Duratube & Wire, Ltd., announces that **Mr. D. R. Smith** has been appointed sales manager for the Home Sales Department, succeeding Mr. R. W. Bishop, who has left the company. Mr. Smith was with Siemens Bros. & Co. from 1920 to 1928, when he joined the sales staff of the London Electric Wire Co. with whom he served until 1946. **Mr. John W. Tydeman** has been appointed manager of the company's Export Department. He commenced his career with the National Telephone Co. and the General Post Office. After war service he joined the Western Electric Co. in 1918 as branch manager in South Wales. He went to the Telephone Manufacturing Co. in 1934 as sales engineer in the telecommunication and transmission section. **Mr. A. T. Buss** has been appointed manager of the Engineering and Design Department, in which capacity he will also be responsible for all publicity and propaganda matters. He received training in Wm. Warne & Co.'s rubber and thermo-plastics laboratory. In 1936 he joined the technical staff of Johnson & Phillips, Ltd., and during the war served on the Thermo-plastic Technical Committee of the Ministry of Supply.

The twenty-first anniversary of the West Midlands Joint Electricity Authority was celebrated on April 22nd and 23rd by a supper and entertainment for the staff and employees at the Civic Hall, Wolverhampton. On each of the evenings about 600 attended. At the first supper the toast of the Authority was proposed by Mr. P. Muldowning (Walsall generating station) and on the second evening by Mr. W. Gibbs (Ironbridge), acknowledgment being made on each occasion by the chairman, Mr. C. Heathcock. Excellent menus were arranged and a varied entertainment was provided by a number of artists introduced by Wilfred Pickles. Music was provided by William Hand and his orchestra.

The annual dance, given by the management of Arrow Electric Switches, Ltd., to employees and their friends, was held at the Acton Town Hall on April 14th. This was the first " Arrow " party to be held since 1939 and 650 people were present including Mr. B. S. Skinner (export manager), Mrs. Seawright, Miss Thompson, Mr. G. B. Seawright (managing director), Mrs. Crabtree, Mr. T. S. Crabtree (works director) and Mr. W. L. White (sales manager).

Obituary

Lt. Cdr. H. T. Harrison.—We report with regret the death at Canterbury on April 24th of Lt. Cdr. Haydn T. Harrison, late R.N.V.R., technical adviser to the Electric Street Lighting Apparatus Co. He was seventy-six and had suffered a long illness. For many years Commander Harrison was very prominent in the public lighting field and his segmental mirror reflector fitting was used in the lighting of many towns. At one time he was with Ferranti's and went from there to Faraday House as head of the Standardizing and Testing Department. Later he was senior partner in the firm of Nalder & Harrison, instrument makers. He was a member of the I.E.E. and had been president of the Illuminating Engineering Society.

Mr. A. V. Swallow, works manager of St. Helens Cable and Rubber Co., Ltd., Slough, died in London on April 10th. For the past twelve months, following a major surgical operation, his health had not been good. Mr. Swallow joined the St. Helens Co. in October, 1914. Following the cremation at Woking, a service was held at St. Giles' Church, Stoke Poges, on April 16th, at which all the senior executives of the company and representatives of the sports' sections attended.

Mr. F. W. H. Wheadon.—The death is reported from Adelaide, South Australia, of Mr. F. W. H. Wheadon, M.I.E.E., who until recently was managing director of the Adelaide Electric Supply Co., Ltd.

Mrs. A. J. Fippard.—We learn with regret of the death on April 27th, at Bournemouth, of Mrs. Martha Fippard, wife of Mr. A. J. Fippard, M.I.E.E.

Mr. R. Smith.—The death occurred on April 22nd of Mr. R. Smith, sales manager of Tricity Cookers, Ltd., with which company he had been associated for twenty-five years.

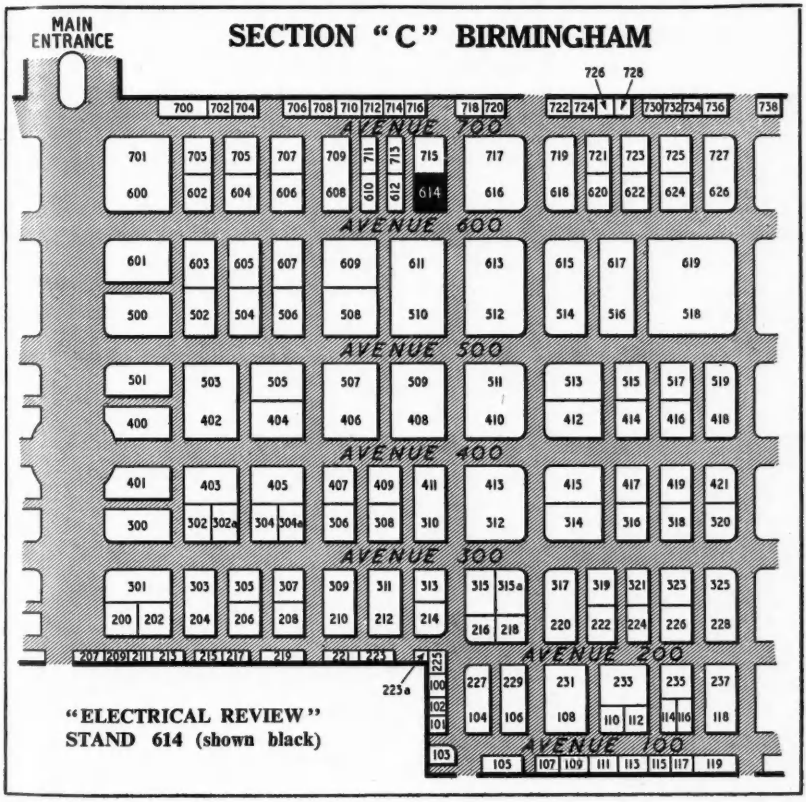
British Industries Fair

Guide to the Electrical Exhibits

THE British Industries Fair, which after an interval of eight years is to be held from May 5th to 16th at Castle Bromwich, Birmingham, and Olympia and Earls Court, London, is the biggest ever, there being altogether over 3,100 firms participating. The proportion of electrical exhibits continues to grow and about one-third of the thousand displays at Birmingham, plus another hundred or so in London, includes items of electrical interest.

All the heavy electrical equipment, power station plant, switchgear and most of the domestic electrical appliances are, as on previous occasions, to be found at Birmingham, while Olympia covers mainly electrical instruments, control gear, clocks, radio apparatus and lighting fittings, with Earls Court making a special feature of plastics and vacuum cleaners. There is a considerable amount of new apparatus to be seen in all sections of the Fair and it is obvious that manufacturers are doing their best to secure potential markets both at home and abroad.

It was fortunate that the Board of Trade decided to discontinue the practice of holding the Fair in February, for the weather and fuel crisis would doubtless have necessitated its cancellation or at any rate postponement.



The pleasanter conditions that can be expected in May should result in a very much larger attendance than has been the case in past years and already hotels in Birmingham, if not in London too, are having to refuse requests for accommodation.

At Birmingham the exclusively or mainly electrical exhibits are grouped in the special Electrical Section ("C"), which also accommodates a very few gas exhibits from the now defunct Gas Section. Visitors with only limited time available should first see this Section and to assist them we reproduce a plan on the previous page. Rather more than one-third of the stands containing items of electrical interest are situated here. It will be necessary to walk several more miles to inspect all the other electrical items distributed among the stands in the Hardware ("A"), Building ("B") and Engineering ("D") Sections.

As on past occasions the *Electrical Review* has a stand (C 614) in a prominent position in the Electrical Section and visitors and exhibitors are cordially invited to call there (or telephone, FAIR 444). Members of our editorial, advertising and publishing staffs will be available to render all possible assistance.

The Castle Bromwich Section is open daily, excluding Sunday, to both trade buyers and the public from 10 a.m. to 6 p.m. In London the hours of admission are from 9.30 a.m. till 7.30 p.m., the public being excluded until 4.30 p.m. Arrangements have been made for organized parties of not less than twenty to be admitted at 1s. 6d. per head, on Saturday, May 10th.

List of Electrical Exhibitors

BIRMINGHAM

Exhibitor	Stand
Accles & Pollock, Ltd.	D 518 & 619
Acru Electric Tool Manufacturing Co., Ltd.	C 215
Aerospray Manufacturing Co., Ltd.	D 732
Aerograph Co.	D 302
Aidas Electric, Ltd.	C 105
Air Ducts, Ltd.	B 300
Aiton & Co., Ltd.	D 608
Aladdin Industries, Ltd.	A 428
Allday, William, & Co., Ltd.	D 503
Allen, Edgar, & Co., Ltd.	D 630
Aluminium Development Association	C 108
Aluminium Industries, Ltd.	A 617
Amplifiers, Ltd.	C 213
Andrew Bros. (Bristol), Ltd.	B 215
Associated Iliffe Press, Ltd.	D 216
Austinlite, Ltd.	D 527
Avery, W. & T., Ltd.	D 420 & 521
Babcock & Wilcox, Ltd.	D 306 & 407
Bakelite, Ltd.	C 404
Balfour, Henry, & Co., Ltd.	D 642 & 743
"Bank" Hardware Manufacturing Co., Ltd.	A 325
Barlite Lamps, Ltd.	C 728
Barries Electrical Agencies, Ltd.	C 302
Belling & Co., Ltd.	C 515
Beresford, James, & Son, Ltd.	C 214
Berger, Lewis, & Sons, Ltd.	B 518
Berry's Electric, Ltd.	C 233
Biddle, F. H., Ltd.	B 324
Birkby's, Ltd.	C 208
Birlec, Ltd.	D 406 & 507
Birmingham Battery & Metal Co., Ltd.	D 514
Birmingham Electric Supply Dept.	C 314
Black & Decker, Ltd.	C 307
Bliss, E. W., (England), Ltd.	D 603
Bowthorpe Electric Co., Ltd.	C 223
Bratt Colbran, Ltd.	C 607
Bray, George, & Co., Ltd.	C 313
British Electrical Development Association	C 408 & 509
British Emulsifiers, Ltd.	A 520
British Insulated Callender's Cables, Ltd.	C 608 & 709
British Jeffrey-Diamond, Ltd.	D 526
British Thomson-Houston Co., Ltd.	C 410 & 511
British Trane Co., Ltd.	B 324
British Vacuum Cleaner & Engineering Co., Ltd.	A516 & D 102 & 203
Brown, David, & Sons (Huddersfield), Ltd.	D 138
Bulpitt & Sons, Ltd.	A 417 & C 506
Buncher & Haseler, Ltd.	A 630
Burco, Ltd.	C 308
Burton Holt (Chelsea), Ltd.	A 305
Cable Makers' Association	C 312 & 413
Calorizing Corporation of Gt. Britain, Ltd.	D 306 & 407
Canning, W., & Co., Ltd.	D 106 & 207
C.A.V., Ltd.	C 501
Central Rediffusion Services, Ltd.	C 302
Chance Bros. & Co., Ltd.	D 527
Chloride Electrical Storage Co., Ltd.	C 417
Christy & Norris, Ltd.	D 403
Churchill, Charles, & Co., Ltd.	D 724
Clang, Ltd.	C 217
Clarkson Thimble Tube Boiler Co., Ltd.	D 306 & 407
Cole, E. K., Ltd.	C 306
Coleman & Appleby, Ltd.	D 103
Collis, J., & Sons, Ltd.	D 522
Concordia Electric Wire & Cable Co., Ltd.	C 221
Cooke & Ferguson, Ltd.	C 109
Cooke, Troughton & Simms, Ltd.	D 105
Copper Development Association	D 232
Counting Instruments, Ltd.	D 238
Crittall, Richard, & Co., Ltd.	B 300
Cruickshank, R., Ltd.	D 226
C.S.A. Industries, Ltd.	B 204
Daniels, T. H. & J., Ltd.	D 310
Danks, Edwin, & Co. (Oldbury), Ltd.	D 306 & 407
Davis & Timmins, Ltd.	C 213
Delepena & Son, Ltd.	D 236
Desoutter Bros., Ltd.	C 415
Diamond Motors (Wolverhampton), Ltd.	C 104 & 227
Dick, R. & J., Ltd.	D 221
Dixon, R. G., & Co., Ltd.	C 702
D.P. Battery & Co., Ltd.	C 711
Dulrae Manufacturing Co., Ltd.	B 300
Dunlop Rubber Co., Ltd.	D 517
Duralite, Ltd.	C 403
Edison Swan Cables, Ltd., and Edison Swan Electric Co., Ltd.	C 604
Edwards, W., & Co. (London), Ltd.	D 411
Electric Construction Co., Ltd.	C 704
Electric Furnace Co., Ltd., and Electric Resistance Furnace Co., Ltd.	C 611
Electric Vehicle Association of Gt. Britain	D 100 & 200
ELECTRICAL REVIEW	C 614
Electro-Chemical Engineering Co., Ltd.	C 611
Electro Hydraulics, Ltd.	D 616 & 717
Electrolux, Ltd.	C 722
Electromagnets, Ltd.	C 605
Elevicon, Ltd.	C 106 & 229
Elfson, Ltd.	A 607
E.M.B. Co., Ltd.	D 134
English Electric Co., Ltd.	C 512 & 613
Eralite Manufacturing Co., Ltd.	C 302a

Elher, Ltd. .. .. C 726
Expanded Metal Co., Ltd. .. .. B 619

Ferranti, Ltd. .. .. C 514 & 615
Fescol, Ltd. .. .. B 706
Firth-Vickers Stainless Steels, Ltd. .. D 320 & 41
Fisher & Ludlow, Ltd. .. .. .. D 202 & 303
Fitz-Gibbon & Murray, Ltd. .. .. C 107
Foster Instrument Co., Ltd. .. .. C 622
French, W. T., & Son, Ltd. .. .. A 433
Fusarc, Ltd. .. .. C 705

General Accessories Co., Ltd. .. .. C 706
General Electric Co., Ltd. .. .. C 402 & 503
Gent & Co., Ltd. .. .. C 407
Gilman, F., (B.S.T.), Ltd. .. .. D 506
Girdlestone & Co. .. .. .. D 333
Gittings & Hills, Ltd. .. .. .. B 322
Gordon, James, & Co. .. .. .. D 234
Green, E., & Son, Ltd. .. .. .. B 504
Grosvenor Utilities, Ltd. .. .. C 734
Guest, Keen & Nettlefolds, Ltd. .. B 526 & 625
G.W.B. Electric Furnaces, Ltd. .. C 220 & 317

Hague & McKenzie, Ltd. .. .. C 502
Hailwood & Ackroyd, Ltd. .. .. C 602
Hancock & Co. (Engineers), Ltd. .. D 638 & 739
Harrison, T. S., & Sons, Ltd. .. .. D 616 & 717
Harvey, G. A., & Co. (London), Ltd. .. B 329
Henryberd, F. C., & Co. .. .. .. C 610
Heifermann Electric, Ltd. .. .. C 223
Herbert, Alfred, Ltd. .. .. D 218, 310 & 319
Hickman, W., & Co., Ltd. .. .. A 634
Hi-Craft Electrical Products, Ltd. .. C 403
Higgs Motors, Ltd. .. .. .. C 601
Hind-Griffiths Furnaces, Ltd. .. .. C 112
Holden & Hunt .. .. C 618 & 719
Hoover, Ltd. .. .. C 710
Hopkins, E. C., Ltd. .. .. .. D 741
Horstmann Gear Co., Ltd. .. .. C 517 & 606
Hotpoint Electric Appliance Co., Ltd. .. C 513
Hotric, Ltd. .. .. C 209
Hurley Machine Co. (England), Ltd. .. C 612

Iddon, Victor H., Ltd. .. .. .. C 109
Imperial Chemical Industries, Ltd. .. D 214 & 315 & 308 & 409
India Rubber, Gutta Percha & Telegraph Works Co., Ltd. .. .. .. D 615
International Combustion, Ltd. .. D 230 & 331 & 239
Ioco Co., Ltd. .. .. D 701

Jackson Electric Stove Co., Ltd. .. C 310 & 411
Johnson, Richard, & Nephew, Ltd. .. B 316 & 417
Jones, E. H., (Machine Tools), Ltd. .. D 612

Kango Electric Hammers, Ltd. .. .. D 718
Kaufmann, H., Ltd. .. .. .. A 502 & 605
Kent, B. B., Ltd. .. .. C 734
King, George W., Ltd. .. .. .. D 404
Kirk Electrical Industries, Ltd. .. .. D 119

Langley Alloys, Ltd. .. .. .. D 241
Langley London, Ltd. .. .. .. C 226
Lansing Bagnall, Ltd. .. .. .. D 719
Leeds Metal Spinning Co., Ltd. .. .. A 418 & 523
Linscott & Co., Ltd. .. .. .. C 106 & 229
Lister, R. A., Ltd. .. .. D 212
Liverpool Electric Cable Co., Ltd. .. C 316
Lockers (Engineers), Ltd. .. .. D 502
Londex, Ltd. .. .. C 718
London Aluminium Co., Ltd. .. A 310 & 411 & D 224
London Electric Wire Co. & Smiths, Ltd. C 316
Lucas, Joseph, Ltd. .. .. .. C 501
Lundberg, A. P., & Sons, Ltd. .. .. C 406 & 507

MacPherson, Donald, & Co., Ltd. .. B 525
Macrome, Ltd. .. .. D 742
Magnetic Valve Co., Ltd. .. .. B 300
Manchester Oil Refinery, Ltd. .. .. D 122
Marconi Instruments, Ltd. .. .. D 505
Martindale Electric Co., Ltd. .. .. C 106 & 229
Matthews & Yates, Ltd. .. .. .. D 705
Measuring Instruments (Pullin), Ltd. .. C 224
Mersey Cable Works, Ltd. .. .. C 406 & 507
Metal Processes, Ltd. .. .. .. D 227
Metal Sections, Ltd. .. .. .. D 518 & 619
Metropolitan-Vickers Electrical Co., Ltd. C 510
Metway Electrical Industries, Ltd. .. C 302
Midland Fan Co., Ltd. .. .. .. A 622
Midland Industries, Ltd. .. .. D 635
Midland Repetition & Auto Manufacturing Co., Ltd. .. .. A 604
Mirrlees-Watson Co., Ltd. .. .. B 320
Moffats, Ltd. .. .. C 505
Mond Nickel Co., Ltd. .. .. .. D 709
Monninger, C. D., Ltd. .. .. .. B 605
Mono Pumps, Ltd. .. .. .. D 714
Morgan Crucible Co., Ltd. .. .. D 204 & 305
Morris, B. O., Ltd. .. .. .. D 513
Moseley, David, & Sons, Ltd. .. .. D 640
Moulded Products, Ltd. .. .. .. D 736
Murex Welding Processes, Ltd. .. .. D 144 & 245

New Process Welders, Ltd. .. .. C 118
Newman Industries, Ltd. .. .. C 304
Newton, L. H., & Co., Ltd. .. .. C 212
Northern Aluminium Co., Ltd. .. .. D 629
Northern Rubber Co., Ltd. .. .. D 728

Oldham & Son, Ltd. .. .. .. C 414
Omes, Ltd. .. .. D 531
Ormond Engineering Co., Ltd. .. .. C 211
Osborn Manufacturing Co., Ltd. .. C 113

Parker, Winder & Achurch, Ltd. .. B 610
Partridge Wilson & Co., Ltd. .. .. C 305
P.B. Sillimanite Co., Ltd. .. .. C 620
Peglers, Ltd. .. .. B 421
Philidas, Ltd. .. .. D 627
Philips Lamps, Ltd. .. .. .. C 609
Phœnix Sales, Ltd. .. .. .. A 502 & 605
Poles, Ltd. .. .. C 319
Power Centre Co., Ltd. .. .. .. C 707
Prat-Daniel (Stanmore), Ltd. .. .. D 234
Premier Electric Heaters, Ltd. .. .. C 206
Pressed Steel Co., Ltd. .. .. .. C 204 & 303
Pritchett & Gold & E.S.P. Co., Ltd. .. C 700
Pullin, R. B., & Co. Ltd. .. .. .. C 224
Pyrotenax, Ltd. .. .. C 720

Quasi-Arc Co., Ltd. .. .. .. C 315

Radlo Heaters .. .. C 714
Rapid Magnetting Machine Co., Ltd. .. C 409
Rawlplug, Ltd. .. .. C 703
Record Electrical Co., Ltd. .. .. C 716
Redfern's Rubber Works, Ltd. .. .. D 110
Rediffusion, Ltd. .. .. C 302
Rev Motors, Ltd. .. .. C 100
Reynolds Tube Co., Ltd. .. .. .. D 520 & 621
Rheostatic Co., Ltd. .. .. .. C 500
Rhymney Engineering Co., Ltd. .. D 230 & 331
Riley Stoker Co., Ltd. .. .. .. D 230 & 331
Rollnick & Gordon, Ltd. .. .. C 702
Rotherham & Sons, Ltd. .. .. .. D 702
Rowell, J., & Son, Ltd. .. .. .. A 650
Rozalex, Ltd. .. .. D 704
Rubery Owen & Co., Ltd. .. .. D 616 & 717
Rudd, E., & Co., Ltd. .. .. .. C 216
Runbaken Electrical Products .. .. C 724
Ryland Works, Ltd. .. .. .. A 519

Salford Electrical Instruments, Ltd. .. C 402 & 503
Salter, George, & Co., Ltd. .. .. A 306 & 407
Sangamo Weston, Ltd. .. .. .. C 412
Sankey, J. H., & Sons, Ltd. .. .. B 406
Schori Metallising Process, Ltd. .. .. D 524
Sciaiky Electric Welding Machines, Ltd. C 222
Scottish Cables, Ltd. .. .. .. C 315a
Senior Economisers, Ltd. .. .. .. D 230 & 331
Sigma Instrument Co., Ltd. .. .. D 612
Simmonds Aerocessories, Ltd. .. .. D 427
Simplex Electric Co., Ltd. .. .. C 406 & 507
Smart & Brown (Engineers), Ltd. .. C 403
Smith, Frederick, & Co. .. .. .. C 316
Smith's Industrial Instruments, Ltd. .. D 727
Sperryn & Co. .. .. D 516 & 617
Spiral Tube & Components Co., Ltd. .. D 706
Standard Telephones & Cables, Ltd. .. C 108 & 231
Stanton Ironworks Co., Ltd. .. .. B 626 & 717
Static Condenser Co., Ltd. .. .. C 714
Steels Electrical Products, Ltd. .. .. B 210
Stephens Belting Co., Ltd. .. .. D 233
Sterling Cable Co., Ltd. .. .. .. C 111
Stewarts & Lloyds, Ltd. .. .. .. D 408 & 509
Stirling Boiler Co., Ltd. .. .. .. D 306 & 407
Stone, J. B., & Co.,Ltd. .. .. .. D 131
Stott, James, & Co. (Engineers), Ltd. .. C 626 & 727
Summerscales', W. & S., Sons .. .. A 521
Sumo Pumps, Ltd. .. .. .. D 527
Swallow Engineering Co. .. .. D 114
Swift, B. & P., Ltd. .. .. .. D 114
Swift Scale Co. .. .. A 322

Tarpen Engineering Co., Ltd. .. .. D 700
Taylor & Challen, Ltd. .. .. .. D 415
Taylor & Wilson, Ltd. .. .. .. A 406
Telsen Electric (1935), Ltd. .. .. C 719
Terry, Herbert, & Sons, Ltd. .. .. B 424
Thomas, Bertram, (Engineers), Ltd. .. D 309
Thompson, John, Engineering Co., Ltd. D 418 & 519
Thorn Electrical Industries, Ltd. .. C 311
Tomlinson (Electric Vehicles), Ltd. .. D 100 & 201
Trist, Ronald, & Co., Ltd. .. .. D 228
Trumeter Co., Ltd. .. .. .. D 738
Tube Products, Ltd. .. .. .. D 520 & 621
Tuscan Engineering Co., Ltd. .. .. C 714

Vactite Wire Co., Ltd. .. .. .. C 316
Valbania, Ltd. .. .. B 712
Van Dorn Electric Tools, Ltd. .. .. C 307
Veret, Ltd. .. .. A 620

Walls, Ltd. .. .. A 313
Walsall Conduits, Ltd. .. .. .. C 715
Wellman Smith Owen Engineering Corporation, Ltd. .. .. .. D 312
Westinghouse Brake & Signal Co., Ltd. C 508
Wiggin, Henry, & Co., Ltd. .. .. D 709
Wild-Barfield Electric Furnaces, Ltd. .. C 220 & 317
Wilkes, A. H. .. .. D 503
Wilkins & Mitchell, Ltd. .. .. .. C 713 & D 600
Williams (Birmingham), Ltd. .. .. A 312 & 413
Willmot Trucks, Ltd. .. .. .. D 644
Wireohms, Ltd. .. .. C 712
Wolf, S., & Co., Ltd. .. .. .. C 603
Wolseley Sheep Shearing Machine Co., Ltd. .. .. D 713
Yorkshire Copper Works, Ltd. .. B 632 & 723
Zinc Alloy Rust Proofing Co., Ltd. .. B 722

LONDON

(E.C. signifies Earls Court; the rest of the stands are at Olympia)

Exhibitor	Stand
Accurate Recording Instrument Co. ..	D 1690
Aircraft Patents, Ltd.	E 1762
Airmec International Sales, Ltd. ..	C 1530
Albion Light Metal Products, Ltd. ..	E.C. 707
Amplivox, Ltd.	D 1683
Andrew & Co., Ltd.	E 1752
Ardente Acoustic Laboratories, Ltd. ..	E 1786
Ashdowns, Ltd.	E.C. 803
Baird & Tatlock (London), Ltd. ..	A 1031
Baldwin Instrument Co., Ltd.	A 1102
Beetle Products Co., Ltd.	E.C. 854
Belling & Lee, Ltd.	C 1540
Bentima Co., Ltd.	E 1752
Birmingham Sound Reproducers, Ltd...	C 1517
Bowen Instrument Co., Ltd.	A 1106
British Ebonite Co., Ltd.	E.C. 828
British Electronic Products, Ltd. ..	C 1535
British Industrial Plastics, Ltd. ..	E.C. 854
British Moulded Plastics	E.C. 819
British Physical Laboratories	A 1033
British Resin Products, Ltd.	E.C. 824
British Rototherm Co., Ltd.	D 1687
British Vacuum Cleaner & Engineering Co., Ltd. B 1456 & 1508, E 1777, F 1848 & E.C. 716	
Bruton, Charles, Ltd.	F 1938
B.X. Plastics, Ltd.	E.C. 809
Bylock Electric, Ltd.	E.C. 719
Cables & Plastics, Ltd.	E.C. 847
Cambridge Instrument Co., Ltd. ..	A 1078
Central Rediffusion Services, Ltd. ..	C 1529
Chance Bros., Ltd.	A 1079
Cinema-Television, Ltd.	A 1081
Compton, John, Organ Co., Ltd. ..	C 1501
Cox, Stanley, Ltd.	A 1063
De La Rue Insulation, Ltd.	E.C. 829
De La Rue Plastics, Ltd.	E.C. 819
Dubilier Condenser Co. (1925), Ltd. ..	C 1525
Duratube & Wire, Ltd.	E.C. 815
Easco Electrical, Ltd.	B 1406
Eastick, J. J., & Sons, Ltd.	C 1536
Ebonestos Industries, Ltd.	E.C. 836
Edwards, W., & Co., (London), Ltd. ..	A 1019
Elco Clocks & Watches, Ltd.	E 1761a
Electric Art Shades (1928), Ltd... ..	F 1845
Electrolux, Ltd.	E.C. 712
Electrothermal Engineering, Ltd. ..	G 2079
E.M.I. Factories, Ltd.	E.C. 821
Ergon Electrical Manufacturing Co., Ltd.	D 1649
Foster Instrument Co., Ltd.	A 1074
Funditor, Ltd.	B 1479
Furzehill Laboratories, Ltd.	D 1679
Gallenkamp, A., & Co., Ltd.	A 1104
General Chemical & Pharmaceutical Co., Ltd.	A 1094
Hale Electric Co., Ltd.	C 1511
Hanovia Ltd.	E 1785
Helios Electric Lamp & Glass Works, Ltd.	A 1050
Hoover, Ltd.	E.C. 714
Ideal Home Electrical Appliances, Ltd.	D 1695
Insulators, Ltd.	E.C. 818
Johnson, Matthey & Co., Ltd... ..	E 1747
Knightshades, Ltd.	F 1934
Labgear	C 1543
Lamson Engineering Co., Ltd.	B 1437
Magneta Time Co., Ltd...	B 1456
Marconi's Wireless Telegraph Co., Ltd.	C 1514
Mechanaids, Ltd...	F 1921
Megatron, Ltd.	A 1037
Metamec, Ltd.	D 1616
Metcalfe Ideal Products, Ltd.	E.C. 575
Midland Industries, Ltd.	E.C. 717
Miles Aircraft, Ltd.	B 1461
Milliwatt, Ltd.	D 1700
Modern Telephone Co., Ltd.	B 1423
Mond Nickel Co., Ltd	A 1057
Mullard Wireless Service Co., Ltd. A 1018 & C 1538	
Multicore Solders, Ltd.	C 1516
Multitone Electric Co., Ltd. ..	C 1523 & D 1699
National Lighting Co., Ltd.	F 1909
Negretti & Zambra, Ltd...	A 1076
New Light Fittings, Ltd.	G 2029
Park Royal Scientific Instruments, Ltd.	D 1685
Permaheat, Ltd.	D 1638
Philips Lamps, Ltd.	C 1536a
Pullin Optical Co., Ltd.	A 1118
Pye, Ltd.	C 1518
Rediffusion, Ltd...	C 1527
Reid & Sigrist, Ltd.	A 1116
Salford Electrical Instruments, Ltd. ..	A 1119
Scientific Instrument Manufacturers' Association of Gt. Britain, Ltd. ..	A 1113
Scophony, Ltd.	A 1066
Selz, Charles, Ltd.	G 2063
Shipton, E., & Co., Ltd.	B 1464
Short & Mason, Ltd.	D 1688
Siegrist-Orel, Ltd.	D 1667
Sigma Instrument Co., Ltd.	A 1074
Smith's English Clocks Ltd.	E 1749
Solus-Schall, Ltd.	D 1701
Standard Telephones & Cables, Ltd. ..	B 1439
Sterling-Croydon Clocks, Ltd.	E 1757
Sterling Engineering Co., Ltd.	E.C. 711
Sunvic Controls, Ltd.	A 1041
Synchromatic Time Recording Co., Ltd.	E 1771
Synchronome Co., Ltd.	E 1759
Taylor Electrical Instruments, Ltd. ..	C 1513
Taylor, Taylor & Hobson, Ltd. ..	A 1030
Telegraph Construction & Maintenance Co., Ltd	C 1524
Thermega, Ltd.	D 1694
Thorn Electrical Industries, Ltd., ..	C 1528
Victoria Instruments	E 1781
Waite & Son, Ltd.	F 1861
Wego Condenser Co., Ltd.	C 1521
Westinghouse Brake & Signal Co., Ltd.	C 1531
Woden Transformer Co., Ltd.	C 1535
Woodmet, Ltd.	G 2030
Youngsigns, Ltd...	E.C. 619

Exhibits at Birmingham

A Stand by Stand Guide to the Electrical Items

Accles & Pollock, Ltd. (D 518 & 619).—All kinds of tubes, tubular box spanners and tools.

Acru Electric Tool Manufacturing Co., Ltd. (C 125).—In addition to the new "Pyrobit" electric hand dryer (illus.) a new unbreakable and practically everlasting soldering iron element has been developed. The "Pyrogrip" is a heavy device for holding screens when fixing in an awkward position.

"Pyrobit" hand dryer (Acru Electric Tool Manufacturing Co.)

Aeraspray Manufacturing Co., Ltd. (D 732).—Spray painting and compressed air equipment and a water wash spray booth.

Aerograph Co., Ltd. (D 302).—Aerograph De Vilbiss spray-painting apparatus, pressure feed tanks, air transformers, pressure regulators, air compressors and exhaust fans.

Aidas Electric, Ltd. (C 105).—A special feature is made of the new "C.E.L." coal-electric "Sadia" water-heater and the "Circoil" heating unit which, used in conjunction with an electric water heater, utilizes hot gases normally wasted in chimneys. The exhibit also includes a full range of standard products.

Air Ducts, Ltd. (B 300).—Steelwork for the electrical industry includes switch cubicles, kiosks, panels and boxes.

Aiton & Co., Ltd. (D 608).—Samples are included of pipework used in the latest high-pressure, high-temperature steam power stations; the Aiton corrugated pipe used for obtaining additional flexibility in pipe lines; a bent pipe manufactured by the creased process, the Aiton Corwel seal-welded joint, the butt-welded joint, steam traps, bellows, expansion joints, etc. Photographs illustrate important installations of P. & B. evaporator distillers in power stations.

Aladdin Industries, Ltd. (A 428).—Portable electric radiators.

William Allday & Co., Ltd. (D 503).—"British Alcosa" fans, heavy-duty forges, furnaces and soldering equipment.

Edgar Allen & Co., Ltd. (D 630).—Tools, steels, permanent magnets and foundry products.

Aluminium Development Association (C 108).—Advice is given here on the use and treatment of aluminium and its alloys.

Aluminium Industries, Ltd. (A 617).—Special "Lion Brand" utensils for hot-plate use.

Amplifiers, Ltd. (C 213).—See Davis & Timmins, Ltd.

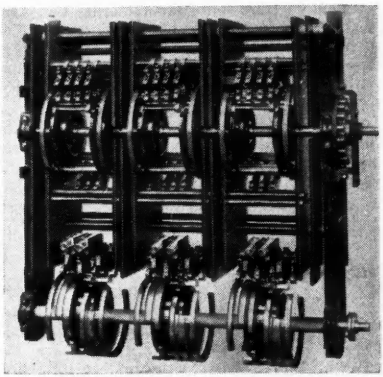
Andrew Bros. (Bristol), Ltd. (B 215).—An electric drying cabinet is among a display of stainless steel units.

Associated Iliffe Press (D 216).—A general Iliffe display, shown against a brilliantly illuminated photo-montage background, represents the chief industries served by the thirty-one technical, trade and specialized journals of this group, the largest of its type in the world.

Austinlite, Ltd. (D 527).—An automatic 400-W self-contained a.c. standby plant, a new heavy-duty 30-A rotary switch and other electrical control gear, relays, contactors, contacting voltmeters, etc.

W. & T. Avery, Ltd. (D 420 & 521).—Universal testing machines capable of carrying out tension, compression, shear, bend, and hardness tests are accompanied by other apparatus for testing compression, cement, hardness, impact, springs, and fatigue. Among dynamic balancing machines is apparatus for dealing with rotors up to 3 tons.

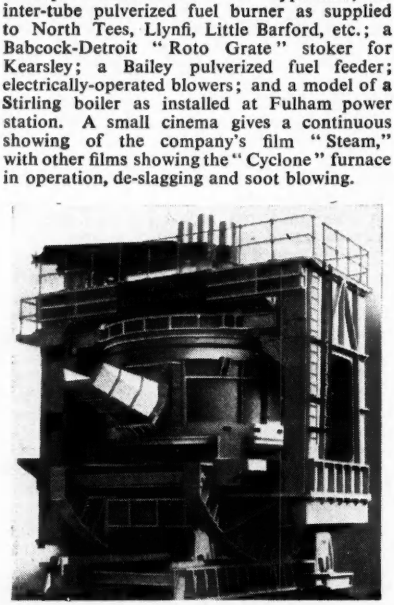
Bakelite, Ltd. (C 404).—Electrical applications absorb by far the greater part of the total output of Bakelite plastics. Typical of heavy equipment relying extensively on Bakelite is a 33-kV on-load tap-changing switch built by the British Electric Transformer Co. (illus.). Other examples of electrical equipment incorporating the company's products range from heavy switchgear to radio and telephone components.



The use of "Bakelite" in heavy electrical equipment is typified by this 33-kV tap-changing switch

The use of laminated Bakelite for electrical instrument cases is an important new application.

Babcock & Wilcox, Ltd. (D 306 & 407).—Principal exhibits are an "E" type mill; an inter-tube pulverized fuel burner as supplied to North Tees, Llynfi, Little Barford, etc.; a Babcock-Detroit "Roto Grate" stoker for Kearsley; a Bailey pulverized fuel feeder; electrically-operated blowers; and a model of a Stirling boiler as installed at Fulham power station. A small cinema gives a continuous showing of the company's film "Steam," with other films showing the "Cyclone" furnace in operation, de-slagging and soot blowing.



10-ton electric furnace (Henry Balfour & Co.)

Henry Balfour & Co., Ltd. (D 642 & 743).—A 10-ton electric furnace (illus.) is an interesting exhibit.

"Bank" Hardware Manufacturing Co., Ltd. (A 325).—In a display of electric fires great attention has been paid to finish, employing a variety of pastel shades. A 4-pint aluminium kettle has an immersion element designed for use on any voltage.

Barlite Lamps, Ltd. (C 728).—Examples of fluorescent tubes and fittings.

Barries Electrical Agencies, Ltd. (C 302).—Electrical accessories, cables and flexibles, switchgear, wood blocks and fluorescent fittings.

New "Baby Belling" cooker

Belling & Co., Ltd. (C515).—Items of particular interest among a complete display of cookers, fires and water heaters for domestic and industrial purposes, are the "Crescent" plastic fire, the "Sherborne" and "Melrose" fires with illuminating effects, the new "Princess" and "Waverley" "Electricoal" fires, warm air circulators (wall and corner types), a new boiling plate, the "Baby Belling" cooker (illus.) and other post-war models.

James Beresford & Son, Ltd. (C 214).—A submersible electric pump (illus.) exhibited for the first time is designed for boreholes as small as 4 in. internal diameter. Its maximum capacity is 550 gal. per hour and the approximate head is 165 ft. The maximum motor rating is 1·2 B.H.P. and the maximum external diameter 3·5 in.

Beresford submersible pump for boreholes of 4 in. inside diameter

Lewis Berger & Sons, Ltd. (B 518). — This company specializes in varnishes.

Berry's Electric, Ltd. (C 233).—The main feature of this stand is a wide range of lighting fittings in wood and wrought iron, with attractive fabric and decorative glass (illus.) shades. Water heaters of storage and immersion types include a coal-electric unit which also airs clothes. "Magicoal" fires appear in various settings, and some new wall mounting fires have "Haloberry" background illumination. Ironclad switchgear completes the display.

Berry's "Golden Leaves" glass lighting fitting

F. H. Biddle, Ltd. (B 324). — See British Trane Co., Ltd.

Birkbys, Ltd. (C 208).—"Elo" synthetic resin mouldings.

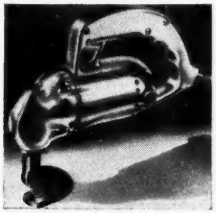
Birlec, Ltd. (D 406 & 507).—The new Birlec-Tama low-frequency induction melting furnace for aluminium and light alloys shown has a holding capacity of approximately 75 lb per hour. Larger models have capacities up to 1 ton per hour. A continuous belt-conveyor controlled-atmosphere furnace, a small "Birlec-Detroit" rocking indirect arc melting furnace, high-frequency induction heating equipment and "Lectrodryers" for removing moisture from air and gases are also demonstrated.

Birmingham Battery & Metal Co., Ltd. (D 514).—Large copper and brass tubes, rods, brass and copper plates, sheets, rolled metal and wire form this display. A special feature is made of superheater, condenser and refrigerator tubes.

Birmingham Electric Supply Department (C 314).—An inquiry bureau gives full particulars

of electrical facilities afforded in Birmingham and offers advice on the electrical equipment of works, etc.

Black & Decker, Ltd. (C 307).—The "Lectro-Shear" (16 gauge) (illus.) has been re-designed to give the operator better control over the tool in use, a new type of shoe also adding strength to the cutting part of the tool. "Ripsnorter" saws, drill stands, sliding arms, electric screwdrivers, bench and portable grinders and sanders are other popular products.



Black & Decker "Lectro-Shear"

E. W. Bliss (England), Ltd. (D 603).—A high-production single crank press, an automatic strip feed press and an inclinable press are shown actually producing components.

Bowthorpe Electric Co., Ltd. (C 223).—Overhead line fittings include some new time- and labour-saving components. Among insulation testing sets are the "Testometer," "Triometer Plus" and a continuity tester.

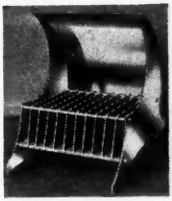
Bratt Colbran, Ltd. (C 607).—"Solectra" convectors of a new design (illus.) embody a low temperature element operating at a high convection efficiency. The emission of the warm air horizontally guards against discoloration of the walls. An inset radiator designed for housing estates may be fitted on any type of wall, a self-cooling convection device creating a secondary air current between the element and the back box. New pressed steel portable fires with parabolic reflectors give maximum radiation with minimum heat loss. Radiators are made in rustless steel and other metals to special designs.

Bratt Colbran No. 207 convector

Geo. Bray & Co., Ltd. (C 313).—Exhibits comprise electro-ceramic insulators for radio telecommunications, domestic industrial apparatus and equipment, metalclad refractory embedded electric heating elements for all types of medium temperature domestic and industrial heating apparatus.

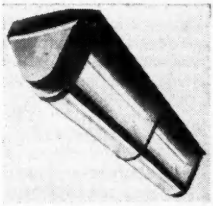
British Electrical Development Association (C 408 & 509).—Around a lounge where visitors may rest during their tour of the exhibition are photographs depicting the use of electricity in the home, industry and agriculture.

British Emulsifiers, Ltd. (A 520).—Electrical products are the "Betafyre" occasional fire, the "Radovection" convection radiators (illus.), "Beta" screen and "Soho" fires, boiling rings and "Betaware" aluminium saucepans for electric cookers.



"Portland Radovection" fire (British Emulsifiers)

British Insulated Callender's Cables, Ltd. (C 608 & 709). — B.I. Callender's magnetic moulding machine is proving of great advantage in these days of overburdened plant and shortage of skilled labour. It is so designed that the operator can concentrate on mould production without having to spend time stripping the finished mould. Power-factor improvement of electric motors through the use of capacitors is demonstrated by a special glass-cased set. Other products displayed are cables and boxes, crane collector equipment, automatic butt welders and a h.f. heater.

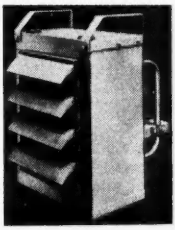


B.T.H. "Mazdalux" fluorescent street lighting lantern

British Jeffrey-Diamond, Ltd. (D 526). — Typical applications of the "Atomill" cover the milling, chemicals, plastics, colours and dye-stuffs, clay and cosmetics and soap industries; cement, gypsum, and agricultural lime works, food product plants, etc.

British Thomson-Houston Co., Ltd. (C 410 & 511).—Experience during the war is reflected in the lighting equipment exhibited. This includes "Mazda" fluorescent lamps; "Mazdalux" industrial and commercial fittings, among which is a new range of twenty-two units all developed from a single basic design; mine lighting equipment, including portable fluorescent units; train lighting fittings; new fluorescent street lighting fittings (illus.), a new "stylised" range of side-entry lanterns and a horizontal enclosed lantern; and an internally silvered infra-red lamp.

British Trane Co., Ltd. (B 324). — Heating, cooling and ventilating equipment shown by the company includes "Vectair" convectors in both surface and con-



"Univectair" industrial heater (British Trane Co.)

cealed types, grilles, air cooling and heating coils for air-conditioning plants and industrial drying or cooling processes, "Univectair" (illus.) and "Projectair" industrial unit heaters, and "Airspin" ventilating fans.

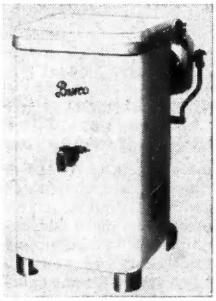
British Vacuum Cleaner & Engg. Co., Ltd. (A 516 & D 102 & 203).—Heavy plant for dust removal, pneumatic conveying industrial portable vacuum cleaners, and sack cleaning plant are accompanied by "Goblin" domestic vacuum cleaners, clocks, irons and "Teasmade" set.

David Brown & Sons (Huddersfield), Ltd. (D 138).—A selection of gears, bronze and alloy steel materials, ancillary tools and instruments made and used by this company and its associates, the David Brown Foundries Co., P. R. Jackson & Co., Ltd., the Keighley Gear Co., Muir Machine Tools, Ltd., the David Brown Tool Co., the Coventry Gear Co., and David Brown Gears (London), Ltd.

Bulpitt & Sons, Ltd., (A 417 & C 506).—Electric kettles, fires, irons, percolators, and electrical hollow-ware.

Buncher & Haseler, Ltd. (A 630).—Aluminium cooking utensils; and pressings, spinnings and stampings for the electrical trade.

Burco, Ltd. (C 308).—A range of wash-boilers includes the "600" type designed for hire and housing schemes, a special unit for temporary housing and two new de luxe models, the "E650" (round) and the "E840" (cabinet). The new "217" cabinet washing machine (illus.) is electrically heated and hand operated.



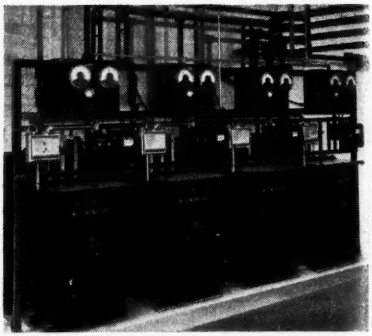
Burco "217" washing machine

Burton Holt (Chelsea), Ltd. (A 305).—Art stone table lamps.

Cable Makers' Association (C 312 & 413).—Samples of cables of all types with feeder pillars, etc. A display of telephone cables includes several historical exhibits.

Calorizing Corporation of Gt. Britain, Ltd. (D 306 & 407).—Calorized heat treatment containers for salt, cyanide and lead hardening and case hardening; pyrometer sheaths; and "Calmet" heat-resisting alloy steel superheater supports, castings, etc.

W. Canning & Co., Ltd. (D 106 & 207).—The "Lumax" plating plant produces a bright nickel alloy deposit that can be taken direct to the bright chrome plating tank without intermediate polishing. Rectifiers of the air-cooled oil immersed selenium plate low-voltage type (illus.) can be safely installed in the plating shop so saving installation costs and reducing power losses: units for both large and small installations are shown, as well as low-voltage motor-generators and accessories.



Typical Canning rectifier for bright nickel plating

C.A.V., Ltd. (C 501).—Electrical starters, dynamos, control gear and batteries.

Central Rediffusion Services, Ltd. (C 302).—Sound amplification equipment, including special apparatus for factory use.

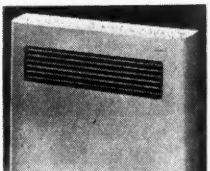
Chance Brothers, Ltd. (D 527).—Lighthouse equipment.

Chloride Electrical Storage Co., Ltd. (C 417).—New switch-tripping equipment incorporating the cells, trickle-charge and testing gear in a single cabinet can also be used for supervisory equipments, electric impulse clocks and burglar alarms. New "finger tip" filler and vent arrangement of commercial battery vehicles enables topping-up to be controlled automatically, and double terminal posts are fitted. The "Drymax," a new dry battery for radio and hearing aids, is about one-third the weight and size of the equivalent standard battery and has a much longer shelf-life. Car batteries are in new streamlined containers.

Christy & Norris, Ltd. (D 403).—"Essex" mills, hammer mills, pulverizers, disintegrators and laboratory equipment.

Charles Churchill & Co., Ltd. (D 724).—The "Melo-Chyme" door call.

Clang, Ltd. (C 217).—A new light-saving switch operates without a resistance, the amount of electricity consumed corresponding to the volume of light selected.



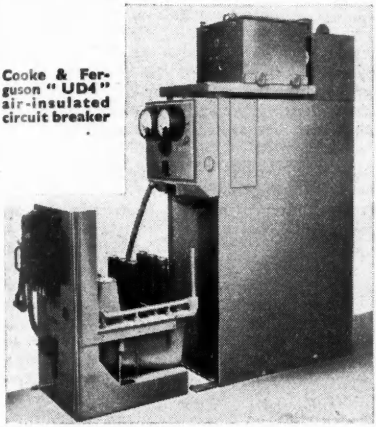
Type "S" Thermovent (E. K. Cole)

Clarkson Thimble Tube Boiler Co., Ltd. (D 306 & 407).—See Babcock & Wilcox, Ltd.

E. K. Cole, Ltd. (C 306).—Special emphasis is placed on fluorescent lighting. An all-perspex reflector, several highly adaptable open-top industrial and commercial fittings for 1-3 lamps and a fitting with an angular reflector specially suited to commercial display, are new products. Special items are cinema projector lamps, lamps for ozone generators, neon units, a crucifix light and the "Plastalux" all-plastic table lamp. Inset and floor-standing "Thermovent" heaters (illus.) in black and walnut plastic casings with anodized aluminium grilles, all have improved elements. New marine types are shown.

Coleman & Appleby, Ltd. (D 103).—Electroplating plant, rectifiers, polishers and accessories.

J. Collis & Sons, Ltd. (D 522)—An electric-hydraulic stacker and the "Motaveyor" conveyor are of special interest.



Cooke & Ferguson "UD4" air-insulated circuit breaker

Concordia Electric Wire & Cable Co., Ltd. (C 221).—Electric wires, cables and flexibles with all types of insulation, resistance wires, cord assemblies, insulating varnishes, etc.

Cooke & Ferguson, Ltd. (C 109).—The new UD4 metalclad switchgear (illus.) demonstrated is of the low oil content, horizontal, single-break type, suitable for 150-MVA at 6·6 kV, but in the same size of unit the range goes up to 1,200 A, 250 MVA, 6·6 kV and 11 kV. The Nelson stud welding process covers the welding of mild steel studs up to ½ in. in diameter on to mild steel plate. The company's standard air compressor layout is suitable for air-blast switchgear operation and industrial application.

Cooke, Troughton & Simms, Ltd. (D 105).—This exhibit consists of an optical dividing head, works measuring microscope, optical clinometer, horizontal comparator, optical comparator and Vickers projection microscope.

Copper Development Association (D 232).—Examples of applications of copper and its alloys to the electrical industry include a 264-kV gas-filled cable, trailing cables for mines, overhead-line conductors, beryllium copper instrument springs, a 2,000-A copper alloy shunt, pressure sensitive elements and other instrument parts, commutators, resistances, contacts and earthing electrodes. A magnetron indicates the importance of copper in the development of radar.

Counting Instruments, Ltd. (D 238).—Electromagnetic counters.

Richard Crittall, Ltd. (B 300).—Attention is drawn particularly to "Dulrae" heating apparatus, "Medrae" dado wall-type panels, "Hirae" suspended-type heaters, the "Medrae" portable warmer and towel airer. There is a complete new range of channel conduit with easy capping facilities. Typical models of electric kilns, infra-red drying ovens, and kitchen equipment are also included.

R. Cruickshank, Ltd. (D 226).—Degreasing and plating plant, rectifiers, polishing and grinding machines.

C.S.A. Industries, Ltd. (B 204).—A thermostatically controlled electric coffee maker is among a display of aluminium ware.

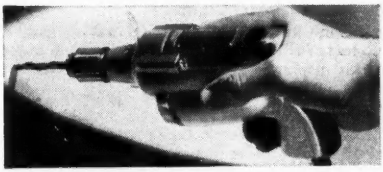
T. H. & J. Daniels, Ltd. (D 310).—Plastic moulding machinery.

Edwin Danks & Co. (Oldbury), Ltd. (D 306 & 407).—An "Oldbury" type stoker.

Davis & Timmins, Ltd. (C 213).—These exhibits include screws, nuts, washers, terminals, cable sockets and connectors, conduit bushes, all types of brass automatic screw machine repetition parts used in the electrical trades, together with inserts for plastics, presswork, etc.

Delepena & Son, Ltd. (D 236).—Pre-heater and radio-frequency eddy-current heaters for plastics, etc.

Desoutter Brothers, Ltd. (C 415).—Of special interest is a demonstration of high-speed screw-driving and nut-running on small assemblies. Electric drill guns (illus.), screw guns, nut-runners and heavy-duty drills are accompanied



Desoutter "S I" streamlined electric drill

by a selection of pneumatic tools and standardized die sets.

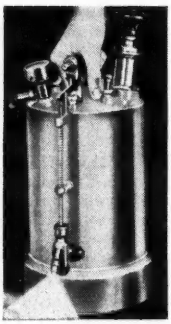
Diamond Motors (Wolverhampton), Ltd. (C 104 & 227).—The "Graiseley" pedestrian controlled

"Graiseley" industrial electric truck (Diamond Motors)

electric vehicles (illus.) shown incorporate improved steering and control, disc wheels, roller bearing hubs and brakes, and master switch.

R. & J. Dick, Ltd. (D 221).—Power transmission units, including flat belting and Vee ropes, are seen in action, photographs showing typical installations.

R. G. Dixon & Co., Ltd. (C 702).—Vacuum cleaner, suction floor polisher and floor scrubber are combined in a "Columbus" machine. A floor polish sprayer (illus.) incorporates a thermostatically-controlled electric heater. For use in factories, hotels, etc., there are the Dixon floor scrubbers and power suction squeegees for removing dirty water after scrubbing.



"Columbus" floor polish sprayer (R. G. Dixon)

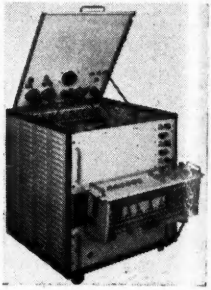
D.P. Battery Co., Ltd. (C711).—The diverse uses for which D.P. batteries have been designed is emphasized by a 10,200-Ah cell for colour film as supplied to Pinewood Studios, the method of packing a 265-cell 2,600-Ah battery for the docks and harbour installation at Lourenço Marques, cells as supplied for power stations in Russia and Holland, and electric vehicle batteries.

Dulrae Manufacturing Co., Ltd. (B 300).—See Richard Crittall, Ltd.

Dunlop Rubber Co., Ltd. (D 517).—Rubber products for the electrical industry are included in this display.

Duralite, Ltd. (C 403).—See Smart & Brown (Engineers), Ltd.

Edison Swan Electric Co., Ltd. (C 604).—The "Ediswan" low-frequency wave analyser (illus.) for use with the electro-encephalograph to assist brain specialists in their diagnosis, an electric welding torch for welding plastic materials, multiple glass-to-metal seals, vacuum capacitors, new "Loudspeakerphone" internal communication system, industrial thermionic valves, "Tungar" battery chargers, batteries, wind chargers, sound and radio equipment, fluorescent lighting equipment, street-lighting lanterns and flood lighting equipment make up this exhibit.

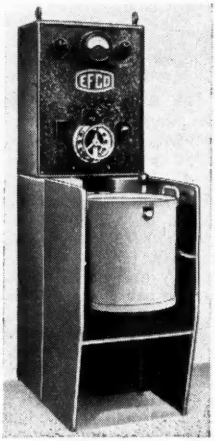


"Ediswan" low-frequency wave analyser

W. Edwards & Co. (London), Ltd. (D 411).—Recent advances in high vacuum technique are represented by vacuum coating, electron diffraction camera and centrifugal freeze drying installations.

Electric Construction Co., Ltd. (C 704).—An example of the "Varispeed" drive is similar to a large number supplied up to 350 B.H.P. A three-phase slip-ring induction motor of the screen-protected type can also be made drip-proof, pipe-ventilated or totally-enclosed. Ammeters, voltmeters, switches, switchboards, and starters are also represented.

Electric Furnace Co., Ltd. (C 611).—The newest applications of "Efco-Tocco" induction heating equipment are for heating in forging, brazing and soldering and heat treatment. A working model for continuously heating small steel slugs for forging is shown. The "Efco-Sentry" furnace for hardening high-speed steel and for tool tipping has non-metallic elements and uses a carbon muffle, which prevents carburization and decarburization Carburizing, tempering, nitriding, high-speed steel, hardening and neutral heat treatment can be done in the compact "Efco Ajax-Hultgren" electrode type midget salt bath (illus.). A multi-purpose controlled atmosphere and semi-continuous furnace can be used for copper brazing, low-temperature brazing, bright annealing and bright hardening. A new type of transfer mechanism for electroplating plants, etc., is also shown.



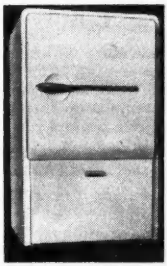
Efco Ajax-Hultgren electrode type salt bath

Electric Vehicle Association of Gt. Britain, Ltd. (D 100 & 200).—Representative examples of members' products form this display.

Electro-Chemical Engineering Co., Ltd. (C 611).—See Electric Furnace Co., Ltd.

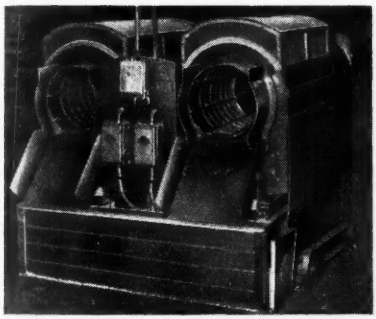
Electro-Hydraulics, Ltd. (D 616 & 717).—Conveyancer fork lifting trucks available in both petrol and electric types are shown with various attachments for special work.

Electrolux, Ltd. (C 722).—Absorption type refrigerators with no moving parts, ensuring complete silence, long life and low maintenance costs. The "L.300" 3-cu ft model cabinet is shown for the first time together with the new "Z.30" suction cleaner.



Electrolux "L 150" refrigerator

Electromagnets, Ltd. (C 605). — The new "Rotocyl" rotary cylinder-type portable magnetic separator (illus.) is suitable for treating mixed swarf and general waste products. Other improved and new equipments include lifting magnets, magnetic separators for practically every industry, magnetic clutches, etc.

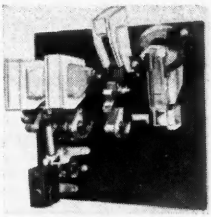


"Rotocyl" magnetic separator (Electromagnets)

Elevicon, Ltd. (C 106 & 229).—Vibratory convertors for industrial, vehicle and ship lighting, with tubular signs, etc.

Elfson, Ltd. (A 607).—A hand-operated cabinet wringer with electric drying and airing facilities, and a combined fire, fire-screen and occasional table are novelties.

E.M.B. Co., Ltd. (D 134).—Unbreakable jointless and rustless grid type resistances, steel case drum type reversing controllers, air-break contactor starters, new heavy-duty a.c. contactors for mining work (illus.), and single-pole d.c. units for battery vehicle service duty form the electrical display. Among the mechanical exhibits are new diecasting and injection moulding machines and a 50-ton moulding press for thermo-setting materials.

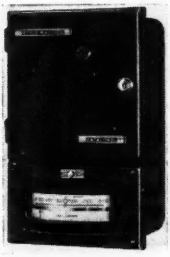


New E.M.B. contactor with clockwork relay

English Electric Co., Ltd. (C 512 & 613).—Apart from photographic panels illustrating the heavy engineering activities of the company, it is concentrating on its lighter products. A colour-matching indicator, a motor controller employing thyratrons and a cathode-ray tip clearance indicator are examples of the work of the electronic section. A 5-kV insulation test set is suitable for power station and general electrical engineering applications. Fusegear exhibits include h.r.c. fuses, distribution boxes, outdoor pole-mounting fuse units, combined fuse switchboards and overhead busbar systems. The h.f. ionizer unit assists in the welding of very thin metal. Besides prepayment meters, indicating and portable instruments a new departure is an electronic differential analyser. Among "Ritemp" domestic appliances, is the 2002R cabinet cooker with a special 4-kW hot-plate with simmer control, washing machines (including a perspex demonstration model), a plate-warmer with the element bonded to the underside of a sheet of plate glass, and a modern 2-kW fire.

Eralite "Cuisiniere"

Eralite Manufacturing Co., Ltd. (C 302).—The "Conflector," which combines convector and radiator, is available in portable, inset and "Panflector" types, the last-mentioned being for installation in rooms without fireplaces. The "Chaudeau" kettle, the "Cuisiniere" table cooker (illus.), and the "Chaudelaine" towel rail are other up-to-date appliances.

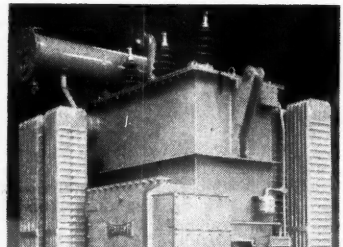


Ether "Capacitrol"

Ether, Ltd. (C 726).—The Ether-Wheelco "Capacitrol" electronically operated temperature controller and "Flame-otrol" combustion safeguard device are now made in this country. Ether direct-writing recording pyrometers, electronically operated, give a full scale deflection in one-fifth second for a power input at 0·5 mV.

Expanded Metal Co., Ltd. (B 619).—Rustless unbreakable resistances and electric heater units.

Ferranti, Ltd. (C 514 & 615).—New " Sunera " fires make their appearance and there is a full range of immersion and thermal storage water heaters including hairdressers' type. New electric clocks in wood, plastic, glass, chromium and coloured perspex include an automatic alarm model. Among house service, switchboard, m.d. and two-rate meters and meter testing equipment, are an improved " FL " single-phase quarterly, or credit and prepay-



2,000-kVA Ferranti transformer fitted with camshaft contactor tap-changing gear

ment model and a compact new d.c. Ah meter. Of special interest is the micro-gap switch now fitted in a.c. prepayment meters. A new 7-range clip-on ammeter is shown for the first time, together with electrostatic-type h.v. indicators, summation metering equipment, and instruments withstanding the most severe tropical conditions. Stroboscopic equipment, cold cathode relay tubes, xenon filled h.v. rectifiers, miniature h.v. rectifiers and glass-to-metal seals are some of the electronic devices shown. A distribution feeder pillar type moving-coil regulator; h.v. power transformers; camshaft contactor on-load tap-changing gear (illus.) for power transformers up to 5,000 kVA, 40 kV; h.v. cable-testing equipment and pole-type distribution transformers are shown working.

Fescol, Ltd. (B 706).—Examples are shown of prevention of corrosion and wear of articles by the " Fescol " process, depositing coatings of nickel and chromium.

Firth-Vickers Stainless Steels, Ltd. (D. 320 & 419).—" Staybrite " stainless and heat resisting steels and examples of finished articles.

Fisher & Ludlow, Ltd. (D 202 & 303).—The " Bendix " washing machine is now being made in the company's factories.

Fitz-Gibbon & Murray, Ltd. (C 107).—A whole range of " Jeani " accessories, together with new type permanent drip candle tubes, pear switches and general repetition work.

Foster Instrument Co., Ltd. (C 622).—Equipment for measuring and controlling temperature includes a temperature programme controller, together with motorised valve operating unit; a redesigned " Flexipush " indicating automatic temperature controller; a telescale illuminated temperature indicator; a 36-point temperature indicator; an optical pyrometer for measuring temperatures up to 1,950 deg C; portable potentiometers; a portable electric furnace for thermo-couple standardization and pyrometer testing ; and a range of introscopes.

W. T. French & Son, Ltd. (A 433).—Electric kettles, fires, irons, toasters and boiling rings.

Fusarc, Ltd. (C 705).—Items shown are the " Marine " deck welder, " Tractor " model, and the " Stationary " welding head, together with the new " Seamec " electrodes.

General Accessories Co., Ltd. (C 706).—The " Surrey " micro-break switch is demonstrated, and " Clix " plugs, sockets, and other accessories are prominently displayed.

General Electric Co., Ltd. (C 402 & 503).—The main theme of this exhibit is electronics—in communications, industry and entertainment, but mining, aeronautical and lighting equipment is also represented. New products of particular interest are a table television receiver, a " Compact " broadcast receiver, a 13-valve superheterodyne receiver; a high fidelity plastic tape recording equipment, disc seal triodes for microwave communication and pulse technique ; a 20-kW anode dissipation water-cooled valve for television, f.m. transmission or h.f. heating; a magnetron oscillator; a photo-cell relay amplifier; a dielectric heating oven for pre-heating plastic flake or powder; a tool-tipping eddy current heating equipment; infra-red plant for rapid drying and preheating; automatic photocell counting apparatus; an aircraft telephone exchange; and an air circulation oven for heating frozen foods.

Gent & Co., Ltd. (C 407).—Exhibits of electric bells include flameproof types and a new 3-in. underdome model which eliminates the conventional box and base; bell indicators; luminous call and staff-locator systems; impulse clock systems; electric clock movements for large public tower clocks; striking, chiming and bell tolling equipment; synchronous clocks; electro-motor sirens; liquid level indicating and recording equipment; fire alarm systems; a new watchman's tell-tale clock system; process timers; telephones and mine signalling apparatus.

F. Gilman (B.S.T.), Ltd. (D 506).—Flexible drive machines for wire brushing, grinding,

polishing, rotary filing, milling, boiler scaling, etc., together with rotary files and milling cutters.

Girdlestone & Co. (D 333).—Ten examples of centrifugal pumps from ¼-in. to 4-in. are designed specially for continuous running in arduous working conditions. A redesigned glandless diaphragm pump suitable for handling acids and corrosive liquids, and the new "S" type float switch are recent developments.

Gittings & Hills, Ltd. (B 322).—Exhibits on this stand indicate the type of finish obtainable with the company's industrial paint materials.

James Gordon & Co., Ltd. (D 234).—Exhibits comprise a Hagan automatic boiler control panel, fitted with the Simplex Mono electrically driven chemical type CO_2 recorders, and "Igema" distance boiler water level indicators.

E. Green & Son, Ltd. (B 504).—Economizers.

Grosvenor Utilities, Ltd. (C 734).—See B. B. Kent, Ltd.

Guest, Keen & Nettlefolds, Ltd. (B 526 & 625).—A sound-film entitled "They're Everywhere" shown in a cinematograph theatre on the stand, records the entire process of manufacturing screws, bolts and nuts, and a wide variety of kindred products.

G.W.B. Electric Furnaces, Ltd. (C 220 & 317).—See Wild Barfield Electric Furnaces, Ltd.

Hague & McKenzie, Ltd. (C 502).—"Pyramid" aluminium cooking utensils for hot-plate use.

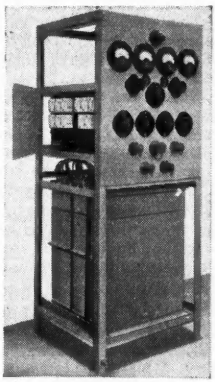
Hailwood & Ackroyd, Ltd. (C 602).—A new range of decorative lighting fittings (both tungsten and fluorescent) and decorated lighting glassware.

Hancock & Co. (Engineers), Ltd. (D 638 & 739).—Oxygen cutting and other special purpose machines include three new units for cutting and profiling tubes.

T. S. Harrison & Sons, Ltd. (D 616 & 717).—Electric grinding and drilling machines, lathes, etc.

G. A. Harvey & Co. (London), Ltd. (B 329).—"Harco" perforated metals, woven wire cloth, wire screens, filing cabinets, storage bins and racks, are a few of the items produced.

F. C. Heayberd & Co., Ltd. (C 610).—Seen here are transformers for electric furnaces, railway signal systems, low-voltage machine lighting, hair-waving equipments and radio sets; battery chargers ranging from the smallest 2-V types up to large multi-circuit units (illus.); and rectifying equipment designed to meet operating conditions all over the world.



Heayberd multi-circuit rectifier cubicle

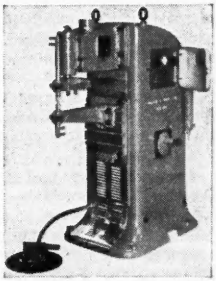
Hellermann Electric, Ltd. (C 223).—Cable binding and marking system and "Helvin" plastic material.

Alfred Herbert, Ltd. (D 218, 310 & 319).—Machines and equipment for the plastics and diecasting industries are accompanied by small tools and measuring equipment including the Hilger universal projector, the "Edgwick" visual hardness tester, and the "Scophony" electronic stroboscope.

W. Hickman & Co., Ltd. (A 634).—Electrically-heated towel rails.

Hi-Craft Electrical Products, Ltd. (C 403).—See Smart & Brown (Engineers), Ltd.

Higgs Motors, Ltd. (C 601).—Standard squirrel-cage and slip-ring motors now incorporate new louvred type end brackets, a longer terminal box, more robust shafts and bearings, and a more efficient ventilation system. The dimensions of the "XH" totally-enclosed fan-cooled motors now compare favourably with those of the screen-protected motor and the initial cost is little greater. The speed range and smooth and accurate control of the company's a.c. variable speed commutator motors is demonstrated.



25-kVA compressed air operated spot welding machine (Holden & Hunt)

Hind-Griffiths Furnaces, Ltd. (C 112).—Electric heat-treatment furnaces and auxiliary equipment.

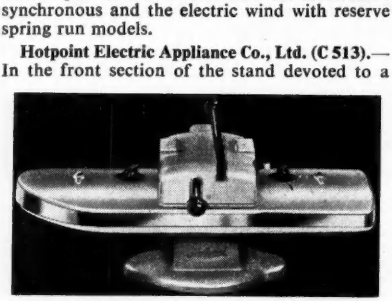
Holden & Hunt, Ltd. (C 618 & 719).—Universal spot welders from 5 to 40 kVA, shown working, include improved automatic wire butt welders, new vertical sliding head (press type) and initial pressure rocker arm compressed air operated spot welders (illus.), and a motor-driven stitch spot welder with infinitely variable speed a.c. motor. Electric rivet heating and bending and lacing machines are also demonstrated. Among resistance welding accessories are the "Statimeter" electrode pressure indicator, "Scadcu" electrode tips, weld timers and a solenoid operated control valve for compressed air.

Hoover, Ltd. (C 710).—Squirrel-cage induction fractional-H.P. motors are made in various types—split phase capacitor or 3-phase, solid or resilient mounting, ball or sleeve bearings. Shaded-pole units are available for electrical appliances, fans, cooling equipment, etc.

E. C. Hopkins, Ltd. (D 741).—Electric portable tools, flexible drives, machine tools, plating and polishing plant.

Horstmann Gear Co., Ltd. (C 517 & 606).—Two improved time switches are the maintained synchronous and the electric wind with reserve spring run models.

Hotpoint Electric Appliance Co., Ltd. (C 513).—In the front section of the stand devoted to a



Hotpoint table ironer

working home laundry and a vacuum cleaner display can be seen an improved form of collapsible and portable clothes dryer and a completely new ironing unit. The other section displays hand irons, kettles, fires, "Torribar" radiant boiling plates, table ironer (illus.), immersion heaters and circulators.

Hotric, Ltd. (C 209).—Principal exhibits are a 1½-gal. thermal storage heater with "Pyrex" glass inner container, a new 3-gal. unit, a 20-gal. dual-heat storage heater, immersion heaters and thermostats.

Hurley Machine Co., Ltd. (C 612).—The "Thor Automagic" machine (illus.) washes both clothes and dishes.

Victor H. Iddon, Ltd. (C 109).—Among a range of "Nettle" and industrial lampholders, ceiling roses, switches, bell transformers, transformer buzzers and handlamps are a new b.c. adaptor, designed to prevent unscrewing of any part on insertion or withdrawal, and new 5- and 15-A sunk and surface shuttered sockets (illus.) incorporating anti-flash screens which make it impossible to expose the live tubes without the simultaneous use of at least two pins.

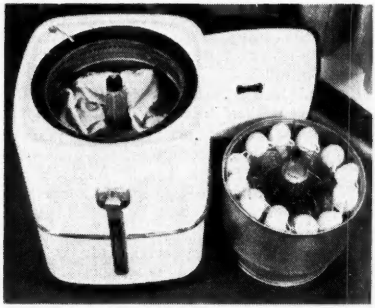
New "Nettle" shuttered socket (Victor H. Iddon)

Imperial Chemical Industries, Ltd. (D 214, 315, 308 & 409).—Metal degreasing, heat treatment and sodium hydride descaling process are demonstrated. The company's Metals and Paints Divisions are also represented.

India Rubber, Gutta Percha & Telegraph Works Co., Ltd. (D 615).—Problems of vibration, corrosion, abrasion, flexing, electrical resistance, the sealing of joints and surfaces, etc., are dealt with on this stand.

International Combustion, Ltd. (D 230, 331 & 239).—A "Synchrophone" sound and visual unit indicates features of the company's steam generating plant, and there is a model of a boiler for the Pyrmont, N.S.W. station, claimed to be the largest high pressure steam generating unit in the British Empire. The latest pulverized fuel burner incorporates a tilting feature giving an adjustable furnace performance. Raymond milling plant, a sectional "Vacseal" pump, a "Rovac" rotary vacuum filter, a "Syntron" electric feeder, a "Junior Hummer" electrically vibrated screen, a "Raymond" laboratory mill, a "Rotap" testing sieve shaker and a "Syntron" packer represent other aspects of the company's production.

Ioco, Ltd. (D 701).—"Linapex" empire varnished cloths and tapes, varnished insulating silk, "Silopex" varnished insulating glass fabrics and tapes "Ocobind" black adhesive tape, oil-cottons for cable use, "Formapex" laminated synthetic resin sheets, bearings, tubes, and varnished papers, etc.



"Thor Automagic" clothes and dish washer (Hurley)

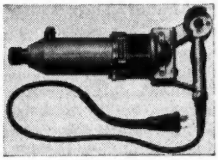
Jackson Electric Stove Co., Ltd. (C 310 & 411).—The new 190 series of domestic cookers is represented by the 192J, 193J and 194 models, all of which can be equipped with the redesigned Backer-Jackson radiant boiling plate and "Simmerstat." The No. 900 wash-boiler is now in full production. The "Chef's Range," constructed on the unit principle, permits enlargement by additional units. A twin-ring boiling plate unit meets the demand for a compact portable appliance for restaurants, etc. Hot cupboards, boiling tables, grills, toasters, pastry-ovens, steaming and roasting ovens, vegetable boiling pans, water and coffee urns and electrically-heated food trolleys are shown.

Richard Johnson & Nephew, Ltd. (B 316 & 417).—A comprehensive range of ferrous and non-ferrous wires.

E. H. Jones (Machine Tools), Ltd. (D 612).—New "Sigma" introductions are a work projector, air operated hand comparator, 4,000:1 magnification electrical hand com-

parator, internal and external length measuring machine, "Junior" comparator, and internal mechanical hand comparator. Multi-inspection machines, mechanical comparators and the "Makonus" electric etching pencil have been improved.

Kango Electric Hammers, Ltd. (D 718).—The new model "S" type hammer (illus.) weighs only 12 lb and is eminently suitable for cutting pipe chases, scaling boilers, etc. The "C" and "D" type hammers and the spade hammer have all been improved to reduce vibration, enhance cooling and increase armature life.



"S" type Kango hammer

H. Kaufmann (A 502 & 605).—Vacuum cleaners and irons.

B. B. Kent, Ltd. (C 734).—In addition to an enamelled cooker and electrical equipment parts, this company is exhibiting de-enamelled parts, i.e., faulty enamelled cooker parts stripped ready for reprocessing.

Geo. W. King, Ltd. (D 404).—Mechanical handling plant includes conveyors, cranes and electric hoists.

Kirk Electrical Industries, Ltd. (D 119).—Towel rails and airers, electric motors, switchgear and immersion heaters.

Langley Alloys, Ltd. (D 241).—Welding electrodes, special forgings and stampings.

Langley London, Ltd. (C 226).—Mica processed in all shapes, micanite and laminated plastic tubes and bushes, and bakelite laminated stampings form a display of components for every branch of the electrical industry.

Lansing-Bagnall (D 719).—Electric battery trucks.

Leeds Metal Spinning Co., Ltd. (A 418 & 523).—Aluminium cooking utensils.

Linscott & Co., Ltd. (C 106 & 229).—Lines in production are the "Markit" hand engraving machine, the "Toolmarker" etcher, the "Springwinder" spring making machine and the "Aero-Auto" centreless mica undercutter. The company also invites inquiries for the manufacture of small electrical equipment.

R. A. Lister & Co., Ltd. (D 212).—A 2-ton pneumatic tyred elevating platform model auto truck, with component parts and sub-assemblies.

Liverpool Electric Cable Co., Ltd. (C 316).—In a display of electric cables and flexible cords is a special exhibit featuring "conducting rubber cable." The complete "Lecupler" system of bolted flameproof cable couplers can also be seen.

Lockers (Engineers), Ltd. (D 502).—Vibrating feeders, conveyors and screens.

Londex, Ltd. (C 718).—Electrical remote control equipment consisting of relays of all kinds, timers, liquid-level control apparatus, flow indicators, signalling devices and photo-electric control apparatus.

London Aluminium Co., Ltd. (A 310 & 411 & D 224).—Electrical trade fabrications in ferrous and non-ferrous metals, spinning, presswork, welding and anodizing.

London Electric Wire Co. & Smiths, Ltd. (C 316).—Main items shown are insulated and covered copper wires, strips and strands for magnet coils, covered resistance wires, heat-resisting cables and flexibles, bare copper braids and cords for flexible connections, switchboard cables and "Glazite" connecting wires.

Joseph Lucas, Ltd. (C 501).—Car electrical equipment.

A. P. Lundberg & Sons, Ltd. (C 406 & 507).—See Simplex Electric Co., Ltd.

Donald MacPherson & Co., Ltd. (B 525).—"Foosheen" plastic finishes and four-hour synthetic finishes are new lines.

Macrome, Ltd. (D 742).—The company is giving details of its special steel treatment for cutting tools.

Magnetic Valve Co., Ltd. (B 300).—A range of magnetic valves, including thermostatically controlled models, is shown with indications of their applications.

Manchester Oil Refinery, Ltd (D 122).—Lubricating and transformer oils.

Marconi Instruments, Ltd. (D 505).—Instruments of special interest are 6-ft moisture and conductivity recorders and indicators; serum electrodes; circuit magnification meters; wave analysers; plating thickness meters; universal bridges; valve voltmeters; beat frequency oscillators; dielectric test sets; chronoscopes; moisture-in-grain meters; and total carbonate recorders.

Martindale Electric Co., Ltd. (C 106 & 229).—Portable blowers, "Commstones" and commutator grinding tools, undercutters, electrical maintenance equipment and protective masks.

Matthews & Yates, Ltd. (D 705).—There are several new types of unit heaters, filters and air washers, "Cyclone" fans.

Measuring Instruments (Pullin), Ltd. (C 224).—Electrical measuring instruments and test sets.

Mersey Cable Works, Ltd. (C 406 & 507).—See Simplex Electric Co., Ltd.

Metal Processes, Ltd. (D 227).—Plant and materials for protecting and colouring metals.

Metal Sections, Ltd. (D 518 & 619).—Cold rolled sections in all metals, and fabricated parts.

Metropolitan-Vickers Electrical Co., Ltd. (C 510).—Peacetime applications of outstanding wartime developments provide the theme for this display which deals with marine radar, jet aircraft components, the "Ripplay" system of centralized control, fluorescent lighting for traction, and mobile power stations.

Metway Electrical Industries, Ltd. (C 302).—All types of heating elements, porcelain accessories, conduit fittings and flexible metallic tubing.

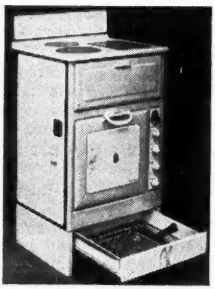
Midland Fan Co., Ltd. (A 622).—Paint-spraying plant, air compressors, exhaust and dust-extracting fans.

Midland Industries, Ltd. (D 635).—This company makes the " Mindus " towel rail and " Milvac " suction cleaners.

Midland Repetition & Auto Manufacturing Co., Ltd. (A 604).—" Rapide " electric food slicing machines.

Mirrlees - Watson Co., Ltd. (B 320).—A high duty two-stage steam operated air ejector with a rectangular surface type intercooler has been developed primarily for large power station installations. Stokers, radial and axial flow steam turbines, centrifugal pumps, distilling plant accessories, " Roscru-Imo " pumps, nitriding and heat treatment are also exemplified.

Moffats, Ltd. (C 505).—Cookers, models 42S, 43S (illus.) and 31SG in colour combination with step-in bases are accompanied by models 42S and 43S in dapple grey to " N.H.D." specification. A complete all - steel electric kitchen includes a cooker, sink, refrigerator, etc.



Moffat 43S cooker

Mond Nickel Co., Ltd. (D 709).—This stand is divided into four sections each illustrating a particular type of advisory service performed by the company's Development and Research Department.

C. D. Monninger, Ltd. (B 605).—Bandsaw electric brazing machines.

Mono Pumps, Ltd. (D 714).—Special pumps for viscous, abrasive or corrosive fluids.

Morgan Crucible Co., Ltd. (D 204 & 305).—Foundry equipment, " Morganite " carbon brushes for electrical machines, radio and heavy duty resistors.

B. O. Morris, Ltd. (D 513).—Flexible shaft machines, polishers, dust extraction plant, etc.

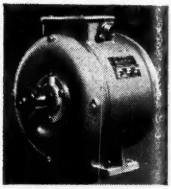
David Moseley & Sons, Ltd. (D 640).—Rubber hose and moulded products, roller coverings, linings, etc.

Moulded Products, Ltd. (D 736).—Every kind of plastic moulding.

Murex Welding Processes, Ltd. (D 144 & 245).—A wide range of electric arc welding plant accessories and electrodes includes a mobile 400-A Diesel engine driven set, a 250-A self-contained transformer and a 300-A mobile motor-generator set fitted with a new type of remote control regulator. The " PV " electrode has been recently developed for welding deep groove type butt welds in thick mild steel.

New Process Welders, Ltd. (C 118).—A new 40-kVA 20-ft welder and an automatic slow butt welder working on a new " impulse " welding principle are among a comprehensive range of spot, butt, flash and seam welding apparatus. There is also a portable rivet heater.

Newman Industries, Ltd. (C 304).—Principal interest is focused on industrial type and fractional - H.P. a.c. motors. Totally-enclosed fan-cooled, double cage, high torque and loom type industrial units (illus.) are represented and there are numerous " Imp " designs ranging from $\frac{1}{16}$ to $\frac{3}{4}$ H.P., all totally enclosed. Motor starters are also displayed and " Cotswold " desk fans are shown in various finishes.



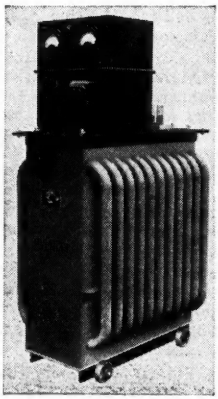
Newman totally enclosed loom motor

L. H. Newton & Co. (C 212).—Nuts, bolts, screws, special precision components, etc.

Northern Aluminium Co., Ltd. (D 629).—This display shows aluminium and aluminium alloy sheet, extruded sections, castings and forgings, and a range of typical applications in engineering. Aluminium extruded sections are used to form reflectors housing 80-W fluorescent tubes providing supplementary lighting.

Northern Rubber Co., Ltd. (D 728).—Mechanical rubber goods for the electrical industry include vulcanized rubber compounded to resist steam, acids, alkalis, heat, oils, and solvents.

Oldham & Son, Ltd. (C 414).—Recent developments are a self-servicing miner's cap lamp and equipment for the charging and maintenance of all forms of miners' lamps. The latest ships' emergency lighting system incorporates provision for using portable lanterns. Car traction and marine batteries, hand lamps, garage charging equipment and meter-testing apparatus are also included.



" Davenset " plating rectifier (Partridge Wilson)

Omes, Ltd. (D 531).— Forgings made by the electrical upsetting process.

Ormond Engineering Co., Ltd. (C 211).—Besides screws, nuts and bolts and special turned parts, this stand contains hand hair-dryers, toasters and electrical accessories.

Osborn Manufacturing Co., Ltd. (C 113).—A comprehensive display of lighting fittings.

Parker, Winder & Achurch, Ltd. (B 610).—Electrical stoking and control are features of the "Parwinac" automatic oil burning heater.

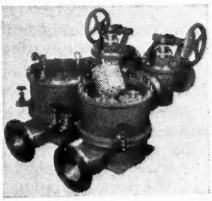
Partridge Wilson & Co., Ltd. (C 305).—Of particular interest among new "Davenset" distribution transformers, selenium, mercury arc and hot cathode rectifying equipments is a portable plating rectifier (illus.) giving 1,000 A. Visitors are able to drive a demonstration electric vehicle chassis through a remote speed controller. A new high discharge battery tester is prominent among commercial battery charging apparatus. A rotary cellar pump is shown stripped down.

P. B. Sillimanite Co., Ltd. (C 620).—Electrical insulators and powders for filling tubular elements, electrical cements and refractory coatings.

Peglers, Ltd. (B 421).—Engineers' brasswork, gunmetal valves, etc., for water, steam, oil and air control.

Philidas, Ltd. (D 627).—Self-locking nuts and devices shown in "industrial" and "turret" patterns are resistant to vibration, changes of temperature, oil, etc.

Philips Lamps, Ltd. (C 609).—Magnetic filters include a new 700-g.p.h. "Easy-clean" model for applications such as grinding, where ferrous contamination is very heavy, and a new type particularly suitable for marine engine filtration (illus.). Also shown are battery chargers, h.f. generators for the induction heating of metals, and arc and resistance welding plant, including rectifiers, transformers and stainless-steel electrodes.



Philips marine magnetic filter

Phœnix Sales, Ltd. (A 502 & 605).—Domestic vacuum cleaners and irons.

Poles, Ltd. (C 319).—"Adastra" galvanized sectional steel poles are made for electrical transmission and distribution, telegraph and telephone lines, street lighting, etc.

Power Centre Co., Ltd. (C 707).—Industrial distribution gear includes recent developments in overhead busbar and cable trunking systems. Unit type switch and distribution boards are a speciality.

Prat-Daniel (Stanmore), Ltd. (D 234).—Working models of an "Aerotec" collector unit and cyclone demonstrate the precipitation of dust from various industrial processes.

Premier Electric Heaters, Ltd. (C 206).—The "Pylon" kettle with its fully automatic safety device, and the "Eight-o-Eight" heat controlled iron with special lighting feature (illus.), are of special interest among a display of fires, hot-plates, urns, coffee percolators, etc.

Premier "Eight-o-Eight" iron

Pressed Steel Co., Ltd. (C 204 & 303).—"Prestcold" refrigeration equipment includes three domestic models, two new service cabinets, ice-cream conservators and condensing and cooling units.

Pritchett & Gold & E.P.S. Co., Ltd. (C 700).—Besides stationary battery cells for house lighting, telephone exchanges and switch-tripping, there are train lighting cells, "Dagenite" car batteries, Peto & Radford aircraft batteries fitted with "Porvic" (microporous plastic material) separators, and starter models for airfield use.

R. B. Pullin & Co., Ltd. (C 224).—Fractional-H.P. motors, blowers and speed indicators.

Pyrotenax, Ltd. (C 720).—The company's mineral-insulated metalclad semi-flexible is now available in pre-assembled cable units for house wiring where multiple repetition of one design is involved. Demonstrations show the ability of this cable to withstand extremely severe operating conditions. A new unbreakable seal with continuous insulation, which eliminates the use of a blow lamp, is shown for the first time.

Quasi-Arc Co., Ltd. (C 315).—Welding sets and electrodes, testing machines, welded model constructions, and specimens of welded joints.

Radio Heaters (C 714).—An extensive range of radio heaters for plastics and rubber pre-heating, drying, wood gluing, seaming, thermo-plastics, moisture determination, cooking foodstuffs, etc.

Rapid Magnetting Machine Co., Ltd. (C 409).—Among magnetic equipment are separators, extractors, purifiers, clutches, chucks, lifting and handling magnets, special "Rapidity" magnetic separators for feebly magnetic ores and sands, and the new "Rapid Magnaclamp."

Rawlplug Co., Ltd. (C 703).—In addition to "Rawlplugs" and "Rawlbolts," other fixing devices are toggle bolts and "Rawlanchors" for making firm fixings in materials in which it is difficult to use screws, nails or nuts and bolts.

Record Electrical Co., Ltd. (C 716).—A selection of the company's latest electrical measuring instruments includes a new continuity tester, a modified "Standard" insulation tester, new flameproof instruments and the "Shirley" moisture meter.

Redfern's Rubber Works, Ltd. (D 110).—Rubber and ebonite products for the electrical industry.

Rediffusion, Ltd. (C 302).—" Redifon " radio frequency heaters for industrial purposes are now available from 300 W to 25 kW.

Rev Motors, Ltd. (C 100).—What is believed to be the smallest electric motor in the world is shown for the first time. The smallest of these " Electrotors," as they are called, is only $\frac{3}{16}$ in. in diameter by $\frac{3}{16}$ in. wide, and weighs less than one gramme. It requires only $1\frac{1}{2}$ V and has a speed of 7,000 r.p.m. The largest type, measuring $1\frac{1}{2}$ in. by $1\frac{1}{2}$ in., takes from 6 to 24 V. They can be used for ciné-cameras, projectors, models, razors, pocket fans, radio control, scientific instruments and domestic labour-saving devices.

Reynolds Tube Co., Ltd. (D 520 & 621).—Manipulated steel tubes and aluminium alloy extrusions, bars, rods and tubes.

Rheostatic Co., Ltd. (C 500).—Working models of the " Satchwell " compensator control for central heating installations, room thermostats and motorized valves are shown, together with immersion thermostats, contactors and automatic controls for oil and solid fuel burners.

Rhymney Engineering Co., Ltd. (D 230 & 331).—A model of the latest skip winding equipment, a new conveyor idler and a conveyor head as shown.

Riley Stoker Co., Ltd. (D 230, 239 & 331).—The " Direkto " stoker and " Robot " underfeed automatic stokers, a continuous brick-kiln stoker and an automatically controlled agricultural grinder.

Rollnick & Gordon, Ltd. (C 702).—See R. G. Dixon & Co., Ltd.

Rotherham & Sons, Ltd. (D 702).—Lubricators, pumps, indicators, gauges, time lags, etc.

J. Rowell & Son, Ltd. (A 650).—The " Ace " electrically-driven and heated washing machine and " Thermicon " boiler.

Rozalex, Ltd. (D 704).—Methods of protection against dermatitis are described on this stand.

Rubery, Owen & Co., Ltd. (D 616 & 717).—Sheet metal work, pressings and machined components.

E. Rudd & Co., Ltd. (C 216).—Name plates of all kinds are a speciality.

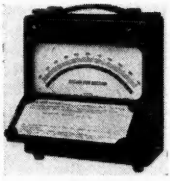
Runbaken Electrical Products (C 724).—The latest products are the " Easidun " electro plater, " Testoscope," " Oilcoil " oil-insulated ignition coil, " Superarc " rectifier, " Echo " armature and " Alert " car alarm.

Ryland Works, Ltd. (A 519).—" Brite-Heat " electric fires and oven thermometers.

Salford Electrical Instruments, Ltd. (C 402 & 503).—See General Electric Co., Ltd.

George Salter & Co., Ltd. (A 306 & 407).—Weighing and testing machines, springs, spring washers, roller bearings, etc.

Sangamo Weston, Ltd. (C 412).—In addition to the latest electricity meters and time switches, new electrical instruments include laboratory standard and sub-standard instruments, a frequency meter (illus.), a 54-range universal test set, three moving-coil relays, a photographic exposure meter, and a pocket-size light meter.



Sangamo Weston frequency meter

J. H. Sankey & Son, Ltd. (B 406).—Refractory and insulation materials, etc.

Schori Metallising Process, Ltd. (D 524).—Metal and plastic spraying.

Sciaky Electric Welding Machines, Ltd. (C 222).—Among resistance welding machines, pedestal and portable spot welders, seam and flash-butt welders there is a special purpose auto-production indexing projection welder.

Scottish Cables, Ltd. (C 315a).—Rubber-insulated and paper-insulated cables include power and mining types. A cut-away 33-kV " H " type cable joint is on view, together with a 33-kV sealing end, while the quality control aspect of manufacture is demonstrated by chemical and h.v. electrical testing equipment. The actual process of braiding small vulcanized rubber insulated flexibles can also be seen.

Senior Economisers, Ltd. (D 230 & 331).—Waste heat recovery is the function of the exhibits on this stand. The H-type gilled tube is the basic feature of various types of economizers.

Sigma Instrument Co., Ltd. (D 612).—See E. H. Jones (Machine Tools), Ltd.

Simmonds Aerocessories, Ltd. (D 427).—The range of Simmonds and " Pinnacle " self-locking nuts and fastenings has been extended. The " Pacitor " electronic contents gauge is a new development. Jointing compound and the " Fram " oil and engine cleaner are other products.

Simplex Electric Co., Ltd. (C 406 & 507).—Items of particular interest are a new " Creda " cooker with three-piece removable interior, plug-in elements and heated plate warming drawer; a new hand-dryer; a water heater display including a cut-away double-purpose water heater; a storage heater linked with recording thermometers indicating constant temperature throughout the storage tank; the new " Creda Halo " iron (illus.); new fires and heavy-duty cooking equipment. There are also redesigned cooker control units, new " Regent " switchfuses, a range of re-styled switchgear, conduit fittings, floodlighting and

New " Creda Halo " iron (Simplex)

street lighting fittings, "Creda" kettles, Lundberg switches and Mersey cables, including flexible, multicore, armoured, mining, welding, varnished and cambric types.

Smart & Brown (Engineers), Ltd. (C 403).—A selection of "Duralite" hot-cathode fluorescent lamps in various colours, is shown with the associated "Hi-Craft" ballast control gear, starters, starter holders, and lampholders. Various applications of fluorescent lamps have been incorporated in the stand design. "Hi-Craft" flush and surface mounting wave matched 5-A a.c. switches and switch sockets in coloured bakelite are also displayed together with 5-A socket outlets and wiring boxes. A working model demonstrates the switch action.

Frederick Smith & Co. (C 316).—Special alloy rods, wire, strip, etc., commutator copper, silver-plated copper and aluminium-copper wires are some of this company's manufactures.

Smith's Industrial Instruments, Ltd. (D 727).—Electrical tachometers, gauges, counting devices, thermometers, thermostats, etc.

Sperryn & Co. (C 516 & 617).—Electric fittings and accessories are a speciality of this company.

Spiral Tube & Components Co., Ltd. (D 706).—A new all-electric unit air heater and a refrigerating unit working a new unit air cooler are shown operating. An oil cooler has been specially developed for transformer oil cooling.

Standard Telephones & Cables, Ltd. (C 108 & 231).—Remote control systems, railway signalling apparatus, cables, rectifiers, telephones, h.f. heating equipment and resistance soldering appliances.

Stanton Ironworks Co., Ltd. (B 626 & 717).—Spun concrete lighting columns.

Static Condenser Co., Ltd. (C 714).—Paper condensers for p.f. correction, communications and industrial uses.

Steels Electrical Products, Ltd. (B 210).—"Euk" catering machinery, dishwashers, toasters, bread slicers, batteries, clothes dryers, cranes and hoists.

Stephens Belting Co., Ltd. (D 233).—Conveyor and vee belts.

Sterling Cable Co., Ltd. (C 111).—Rubber, synthetic rubber and thermo-plastic insulated wires, cables and flexibles include types in colours to harmonize with the particular appliances; also tropicalized insulated cables and flexibles. The central terminal box used in the "Octopus" system of house wiring is also on display.

Stewarts & Lloyds, Ltd. (D 408 & 509).—Steel tubes and fittings, tubular steel coils, "Victaulic" joints and Johnson couplings.

Stirling Boiler Co. (D 306 & 407).—See Babcock & Wilcox, Ltd.

J. B. Stone & Co., Ltd. (D 131).—"Burfree" tube contouring and sheet nibbling machines, flexible conveyor and transmission belt fasteners.

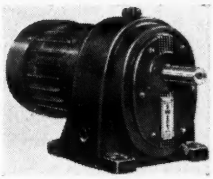
James Stott & Co. (Engineers), Ltd. (C 626 & 727).—Urns, water-boilers, potato peelers, steaming ovens, hot cupboards and carving tables are typical electric catering equipment shown.

W. & S. Summerscales' Sons (A 521).—Power wringer heads for electric washing machines.

Sumo Pumps, Ltd. (D 527).—Submersible pumps.

Swallow Engg. Co. (D 114).—Electric food preparation machinery.

B. & P. Swift, Ltd. (D 114).—Electric "Motogears" reduction units (illus.) can produce output speeds as low as 8 r.p.m. A worm reduction gearbox incorporates a new principle of cooling, enabling higher loads to be transmitted. The Swift high-pressure rotary gear pump has been improved.



Swift "Motogear"

Swift Scale Co. (A 322).—"Swallow" electric mixers and mincers.

Tarpen Engg. Co., Ltd. (D 700).—Generating sets, portable wood planes and hedge trimmers are among this company's products.

Taylor & Challen, Ltd. (D 415).—Automatic notching presses for notching stator and rotor blanks for electric motors are of particular interest.

Taylor & Wilson, Ltd. (A 406).—Electric washing machines include a heated model.

Telsen Electric Co. (1935), Ltd. (C 719).—New lines are a heat-controlled iron, a double-ended iron, two electric warming plates, an electric blanket, electric chimes, plugs, sockets, switch-plugs, etc.

Herbert Terry & Sons, Ltd. (B 424).—An improved range of "Anglepoise" lamps together with presswork, wirework and springs.

Bertram Thomas (Engineers), Ltd. (D 309).—Electric dinner wagons, hot-cupboards, hot-plates, plate warmers, radiators, tubular heaters, car heaters, switchboards and automatic switchgear.

John Thompson Engineering Co., Ltd. (D 418 & 519).—A scale model represents a complete boiler house installation, while a working submerged ash conveyor is typical of hundreds in use in power stations. V-type mechanical stokers, water treatment and purification plant and high-pressure pipework are also displayed, and a new all-welded Lancashire boiler is to be seen in the Outdoor Section.

Thorn Electrical Industries, Ltd. (C 311).—"Atlas" tungsten and fluorescent lamps and fittings, and "Mary Ann" domestic appliances.

Tomlinson (Electric Vehicles), Ltd. (D 100 & 201).—Four types of vehicle shown are the

universal works truck " Model G," range 8-14 miles, speed 3-3½ m.p.h.; the " Omnitruc Model C," range 10-15 miles, speed 5 m.p.h.; the industrial truck " Model B," range 8-14 miles, speed 3-3½ m.p.h.; and the " London " milk pram (illus.), range 8-14 miles, speed 3-3½ m.p.h. The first three units take loads up to one ton; the milk pram has a capacity of 60 gal. of milk in twenty-four standard pint crates.

Tomlinson " London " milk pram

Ronald Trist & Co., Ltd. (D 228).—Amongst many " Molrey " mechanical controls, high and low water cut-outs and alarms and controls for electric pumps and motors are shown working. A glandless magnetic switch and a photo-electric low water alarm are new products. The " Electricon " smoke-detector equipment for the prevention of fires is demonstrated.

Trumeter, Ltd. (D 738).—Counters and measuring instruments.

Tube Products, Ltd. (D 520 & 621).—Cooling tubes for transformer tanks are among an extensive range of straight tubes and manipulated components.

Tuscan Engineering, Ltd. (C 714).—Electric generators and motors, including repulsion induction and flameproof types.

Vactite Wire Co., Ltd. (C 316).—Applications of " Eureka," nickel-chrome and molybdenum wires, tapes and rods to furnaces, lamps, valves, etc., are illustrated.

Valbania, Ltd. (B 712).—" Valba " light fittings include special bathroom units and chromium-plated models designed for tubular lamps.

Van Dorn Electric Tools, Ltd. (C 307).—See Black & Decker, Ltd.

Veret, Ltd. (A 620).—An improved model of the company's thermostatically-controlled electric bedwarmer.

Walls, Ltd. (A 313).—Electric boiling ranges, cookers, fires and aluminium ware.

Walsall Conduits, Ltd. (C 715).—The action of the three pins is necessary before contact is made in new shuttered sockets (illus.). Other exhibits are conduit and fittings, weatherproof and flameproof equipment, switch and fuse gear, ceiling roses, under-floor duct and overhead trunking systems, lighting fittings and heavy industrial 600-V sockets and plugs.

Walsall 15-A surface mounting shuttered socket and plug

Wellman Smith Owen Engineering Cpn., Ltd. (D 312).—Electric cranes.

Westinghouse Brake & Signal Co., Ltd. (C 508).—The double-voltage " Westalite " rectifier is now available in a range of sizes from small elements operating at about 15 mA up to types carrying about 25-30 A per element. Working exhibits comprise automatic plating equipment, rectifiers for the operation of d.c. motors and magnets, battery charging equipment and cinema arc rectifiers.

Henry Wiggin & Co., Ltd. (D 709).—Nickel and nickel alloys, electrical resistance materials, corrosion and heat-resisting alloys and thermostatic alloys.

Wild-Barfield Electric Furnaces, Ltd. (C 220 & 317).—Electric furnaces are made for all heat-treatment processes. Induction and dielectric heating equipments are represented, as well as electrode boilers, carburizing compounds and quenching oils.

A. H. Wilkes (D 503).—Soldering irons.

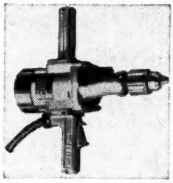
Wilkins & Mitchell, Ltd. (C 713 & D 600).—Cabinet washing machines of the latest type, and power presses are displayed on these two stands.

Williams (Birmingham), Ltd. (A 312 & 413).—" Atlas " aluminium ware for electric cooking.

Willmot Trucks, Ltd. (D 644).—Trucks for cookers and refrigerators.

Wireohms, Ltd. (C 712).—This company specializes in heating elements of all descriptions.

S. Wolf & Co., Ltd. (C 603).—Examples of electric tools are portable hammers, drills, (illus.), screwdrivers, bench sanders, blowers, grinders, chisel mortisers, valve seat grinders, valve refacers and the " Mobilectric " engine shop for garages.



Wolf ¼-in. heavy-duty electric drill

Wolseley Sheep Shearing Machine Co., Ltd. (D 713). — An electric fencer, hand clippers, the " Clipvac " clipping machine designed to work off the vacuum line of a milking machine, " Safeclip " toilet clippers, " Humane " cattle and pig drovers are specialities.

Yorkshire Copper Works, Ltd. (B 632 & 723).—Solid drawn tubes in cupro-nickel and other special non-ferrous alloys.

Zinc Alloy Rust-Proofing Co., Ltd. (B 722).—Specimens of electrical ironwork, rust-proofed by the " Sherardizing " process are displayed.

The London Section

Displays at Olympia and Earls Court

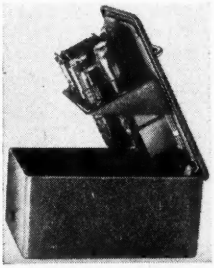
Accurate Recording Instrument Co. (D 1690).—Gauges, thermometers and recorders.

Aircraft Patents, Ltd. (E 1762).—Electric clocks.

Airmec International Sales, Ltd. (C 1530).—Electronic measuring instruments, capacitors and industrial aids.

Albion Light Metal Products, Ltd. (Earls Court 707).—Domestic electric refrigerators.

Amplivox, Ltd. (D 1683).—Besides introducing the "Omnipac" hearing aid this company shows the "Orthosonic" miniature earphone, together with a new church amplifier.



B.E.P. electronic timer

Andrew & Co., Ltd. (E 1752).—Electric clocks in plastic and fancy cases.

Ardente Acoustic Laboratories, Ltd. (E 1786).—Sound reproduction, public address and inter-communication equipment includes a marine sound system, the Ardente-Heinke "Diverphone," room-to-room loud-speaking apparatus, the "Philomel" gramophone record reproducer, church sound equipment, mobile police broadcast systems, hearing aids and special equipment for railways, air ports, docks, factories, cinemas, hospitals, etc.

Ashdowns, Ltd. (Earls Court 803).—Electrical insulation materials.

Baird & Tatlock, Ltd. (A 1031).—Laboratory equipment.

Baldwin Instrument Co., Ltd. (A 1102).—Instruments shown are an X-ray dosometer, Baldwin-Farmer electrometer for X-ray work, a laboratory type electrometer, radium detector, moisture meter, portable Wheatstone bridge, integrating light counter for process work, exposure controller for bromide printing, mains resistance meter, apparatus for measuring small currents, tension control gear for rolling mills, amber mouldings, switchboard and portable type indicating meters and galvanometers.

Beetle Products Co., Ltd. (Earls Court 854).—Beetle and "Scarab" moulding powders.

Belling & Lee, Ltd. (C 1540).—Of special interest are thermal delay switches, fine rating fuses, communal amplifiers, a compact television aerial and a thermal cut-out for motor protection.

Bentima Co., Ltd. (E 1752).—Electric clocks.

Birmingham Sound Reproducers, Ltd. (C 1517).—Sound recording apparatus, inter-office communication and staff location sets, and laboratory test equipment.

Bowen Instrument Co., Ltd. (A 1106).—This exhibit consists of resistance, thermo-electric, radiation and optical pyrometers, both portable and fixed types, for indicating, recording or controlling temperatures.

British Ebonite Co., Ltd. (Earls Court 828).—Ebonite rod, tubes sheets and panels.

British Electronic Products, Ltd. (C 1535).—An electronic timer (illus.), an electro-medical short-wave therapy unit, amplifiers and a radio-gramophone.

British Industrial Plastics, Ltd. (Earls Court 854).—Plastic materials, mouldings and moulds.

British Moulded Plastics, Ltd. (Earls Court 819).—Radio cabinets, instrument panels, telephone sets and exhaust fans are among examples of plastic mouldings.

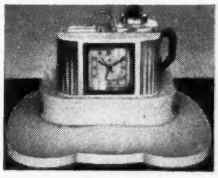
British Physical Laboratories (A 1033).—Measuring and test instruments.

British Resin Products, Ltd. (Earls Court 824).—Particular attention is drawn to the lay-out of the stand, which features different types of plastic materials, "Epok" "Cellobond," "Cellomold," "Chlorovene" and "Rockite." There is a wide range of finished products made from "Chlorovene" paste, a recent development.

British Rototherm Co., Ltd. (D 1687).—Bi-metallic dial type thermometers include heavy industrial types indicating temperatures as low as —100 deg F, and as high as 1,000 deg F. New laboratory and pocket types as well as models with coloured plastic cases are also shown.

Charles Bruton, Ltd. (F 1938).—Table lamps, floor standards and lampshades.

British Vacuum Cleaner & Engineering Co., Ltd (B 1456 & 1508, E 1777, F 1848 & Earls Court 716).—On stand E 1777 "Goblin" and "Magneta" clocks include domestic and large wall clocks, master and slave clocks, and timing systems. Stand B 1456 is devoted to Magneta timing equipment of particular interest to commercial undertakings. The "Teasmade" set is on stand F 1848. On stand B 1508 there is the "Goblin Time-Spot" radio and the Magneta radio set. At Earls Court the display comprises domestic and light industrial vacuum cleaners.



"Goblin Teasmade" set

BX Plastics, Ltd. (Earls Court 809).—" Styrathread " extended " tensilised " threads or filaments of polystyrene have a number of potential applications in the electrical industry. A combination of " Styrathread " wound spacers and " Styrafoil " tape insulation may introduce entirely new designs for h.f. coaxial and symmetrical h.f. cables.

Bylock Electric, Ltd. (Earls Court 719).—The " Triplex " domestic and light industrial type cleaners, the " Duplex " floor polisher, industrial blowers, hand dryers and " Simoon " hair dryers are products of this company.

Cables & Plastics, Ltd. (Earls Court 847).—Electric cables insulated with polythene or p.v.c., and sheathed overall with p.v.c.

Cambridge Instrument Co., Ltd. (A 1078).—Electrical measuring apparatus, industrial precision instruments for measurement and control of temperature, pressure, humidity, etc.

Central Rediffusion Services, Ltd. (C 1529).—In addition to hotel radio services attention is drawn to a special control desk for an extra large public address system, to be installed at the Belle Vue Amusement Park, Manchester. Sound amplification equipment includes special apparatus for factory use.

Chance Brothers, Ltd. (A 1079).—" Neodex " glass has been specially designed for the protection of the eyes of operators engaged in lamp-working glass. A photometric colour temperature conversion filter provides a precise means of increasing apparent colour temperature.

Cinema-Television, Ltd. (A 1081).—Special purpose instruments include metal detectors for locating buried pipes, tramp metal in manufacturing processes, etc.; equipment for recording cosmic and other rays; electronic recorders for showing photographically strain and vibrations in structures; chronometers for measuring periods as short as 250 microseconds; process timers, photo-electric cells, multiplier cells, Geiger Müller tubes, cathode-ray tubes and oscilloscopes.

John Compton Organ Co., Ltd. (C 1501).—A variable control electric space heater and the " Compton Electrone " pipeless organ.

Stanley Cox, Ltd. (A 1063).—Electromedical apparatus.

De La Rue Insulation, Ltd. (Earls Court 829).—" Delaforce " reinforced plastic sheet insulating material has an impact strength, weight for weight, greater than that of steel. " Delaron " synthetic resin-bonded laminated board has exceptional dielectric and mechanical properties and can be machined. Other exhibits are " Traffolyte " engraving and printing material for instrument panels, etc., " Delaflex " insulated sleevings, " Hamofil " connecting wires, and p.v.c. and cellulose acetate butyrate extrusions.

De La Rue Plastics, Ltd. (Earls Court 819).—See British Moulded Plastics, Ltd.

Dubilier Condenser Co. (1925), Ltd (C 1525).—A wide range of capacitors and resistors includes designs to satisfy the most stringent tropical conditions.

Duratube & Wire, Ltd. (Earls Court 815).—P.v.c. insulated " Durawires " and " Duracables," single and multi-cored, solid and flexible conductors and sleevings include unusual designs made for the Services during the war. " Durastrip " manufactured from p.v.c. in attractive colours and designs, is finding increasing application in the electrical industry for packings, strap carriers, etc.

Easco Electrical, Ltd. (B 1406).—Battery charging equipment and the " Call-Boy " intercommunication equipment.

J. J. Eastick & Sons, Ltd. (C 1536).—" Eelex " plugs and sockets, etc.

Ebonestos Industries, Ltd. (Earls Court 836).—This company has specialized in mouldings for the electrical trade for the past forty-seven years.

W. Edwards & Co. (London), Ltd. (A 1019).—The compact new " Speedivac la Rotary " high vacuum pump is suitable for most laboratory and industrial uses. Mobile vacuum pumps and high-speed diffusion pumps are also featured.

Elco glass clock

Elco Clocks & Watches, Ltd. (E 1761a).—An all-glass model is of especial interest in this display of electric clocks.

Electric Art Shades (1928), Ltd. (F 1845).—A special feature is made of troughs for fluorescent lighting, " Electa " bedlights, and a new range of alabaster table standards.

Electrolux, Ltd. (Earls Court 712).—Two internal dust-bag type suction cleaners are displayed, the new " Z.30 " and the lower-priced " Z.25."

Electrothermal Engg., Ltd. (G 2079).—Electric bed-warmers, boiling rings, resistors, heating elements, thermostats and switches are to be seen on this stand.

E.M.I. Factories, Ltd. (Earls Court 821).—Radio-frequency heating equipment is available for plastic moulding, wood treatment, food sterilization, case-hardening of steel, brazing and soldering.

Ergon Electrical Manufacturing Co., Ltd. (D 1649).—Industrial infra-red drying units, medical u.v. quartz mercury and carbon arc and infra-red ray appliances and a new light bath cradle; adjustable table, factory and photographic lamps.

Foster Instrument Co., Ltd. (A 1074).—Introscopes, a portable potentiometer for pyrometer and thermo-couple testing, optical pyrometers, temperature indicators and recorders are some of the instruments on view.

Funditor, Ltd. (B 1479).—Electric heaters for composing machines and remelting furnaces.

Furzehill Laboratories, Ltd. (D 1679).—Electronic laboratory equipment.

A. Gallenkamp & Co., Ltd. (A 1104).—Ovens, centrifuges, humidity cabinets, calorimeter, incubators and other laboratory apparatus.

General Chemical & Pharmaceutical Co., Ltd. (A 1094).—"Oasis" accumulator acid and distilled water, electrolyte for use in nickel-iron batteries and "Vulcan" bright dipping acid for electroplating, etc.

Hale Electric Co., Ltd. (C 1511).—This company mass-produces electrical and radio apparatus to customers' requirements.

Hanovia, Ltd. (E 1785).—The "Alpine Sun" "Sollux" lamp and "Duo-Therapy unit," model IX (illus.), incorporate a new counter-weighted sleeve for easy height adjustment. Other products are the Kromayer lamp for the focal actinotherapy, "Centrosol" lamp for group ultra-violet irradiation, fluorescence lamp for rapid testing of materials for ageing, fading, etc., and an air sanitizer for bactericidal irradiation of enclosed air.

Helios Electric Lamp & Glass Works, Ltd. (A 1050).—Photographic studio lighting equipment and floodlighting apparatus.

Hoover, Ltd. (Earls Court 714).—Besides the standard and "junior" and "Dustette" cleaners, there is a new cylindrical model specially developed for export.

Ideal Home Electrical Appliances, Ltd. (D 1695).—Violet-ray "Vitalators" for high-frequency electro-medical treatment.

Insulators, Ltd. (Earls Court 818).—Plastic mouldings include lighting fittings, switch covers and bases, fuse boxes, terminal blocks, radio equipment, laminated mouldings, 5-, 7- and 10-pin plugs and covers, "Avominor" test instruments, medical and scientific instruments.

Johnson, Matthey & Co., Ltd. (E 1747).—Problems relating to precious metals can be discussed here.

Knightshades, Ltd. (F 1934).—Decorative lighting fittings in metal, glass and plastic.

Labgear (C 1543).—Electronic measuring instruments.

Lamson Engg. Co., Ltd. (B 1437).—Pneumatic carrying systems, conveyors, hoists, and industrial vacuum cleaning plant and air-conditioning apparatus.

Magneta Time Co., Ltd. (B 1456).—Timing equipment, fire alarm, intercommunication and staff-location systems.

Marconi's Wireless Telegraph Co., Ltd. (C 1514).—Apparatus for every branch of wireless communication includes broadcasting equipment, navigational aids and police radio. Wavemeters, signal generators, universal bridges, electrostatic viewing units, frequency meters, alignment oscilloscopes, etc.

Mechanaids, Ltd. (F 1921).—Intercommunication telephones for works, offices and houses.

Megatron, Ltd. (A 1037).—Photo-electric cells, switchgear, counters and sorters.

Metamac, Ltd. (D 1616).—Electric clocks in attractive wooden cases.

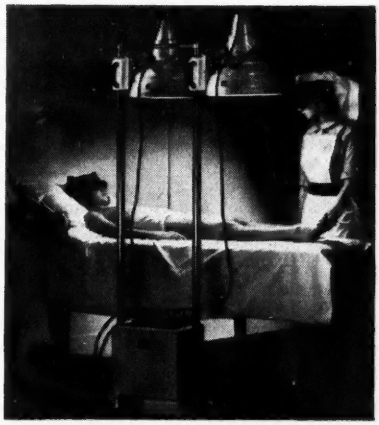
Metcalfe Ideal Products, Ltd. (Earls Court 575).—Electric slicers, shredding and food preparing machines, potato peelers, etc.

Midland Industries, Ltd. (Earls Court 717).—"Milvac" vacuum cleaners, the "Mindus" towel rail and other electrical apparatus.

Miles Aircraft, Ltd. (B 1461).—The "Copytone" portable dictating machine incorporates a special type of microphone and loudspeaker leaving both hands free when dictating or listening.

Milliwatt, Ltd. (D 1700).—Electrically heated flying suits adopted by the U.S.A. Air Force are prominent, together with electric blankets and heating pads.

Modern Telephone Co., Ltd. (B 1423).—Intercommunication telephone systems.



Hanovia Model IX duo-therapy unit

Mond Nickel Co., Ltd. (A 1057).—Sections of storage battery plates illustrate the use of nickel and the cobalt salts as the active materials in positive plates.

Mullard Wireless Service Co., Ltd. (A 1018 & C 1538).—In addition to valves and a new range of amplifiers, this company is showing a special cathode ray oscillograph for l.f. investigations, a universal measuring bridge and conductivity cell, a moisture meter, a potentiometric titration apparatus, "Ticonal" permanent magnets, high stability resistors, "Kaymax" high permittivity dielectric materials, the "Varite" semi-conductor and a new micro-second flash tube for ultra-high-speed photography.

Multicore Solders, Ltd. (C 1516).—" Ersin " multicore solder containing three cores of non-corrosive flux is available in a new pack.

Multitone Electric Co., Ltd. (C 1523 & D 1699).—The new M.T.3 deaf aid is believed to be the smallest in the world, measuring only 3¼ in. by 1 $\frac{15}{16}$ in. by $\frac{11}{16}$ in., and weighs only 2½ ozs. A radio set for the deaf is also of particular interest.

National Lighting Co., Ltd. (F 1909).—" Neatlite " domestic appliances and lighting fittings of all kinds.

Negretti & Zambra, Ltd. (A 1076).—Controllers and recorders for temperature, pressure or liquid level; pyrometer or resistance thermometers and quick reading potentiometers are among a comprehensive display of instruments.

New Light Fittings, Ltd. (G 2029).—Period and modern lighting fittings in non-ferrous metals and wrought-iron.

Park Royal Scientific Instruments, Ltd.(D 1685).—Acoustical electronic devices and other scientific instruments.

Permaheat, Ltd. (D 1638).—Shown for the first time is a double-bed electric blanket with independent switching for two users. Electrically heated pads, clothing, boots, gloves, muffs, etc., are also represented.

Philips Lamps, Ltd. (C 1536 a).—An Admiralty transmitter, a general purpose communications receiver, and f.m. communications equipment.

Pullin Optical Co., Ltd. (A 1118).—Projectors, etc.

Pye, Ltd. (C 1518).—This exhibit comprises radio and television apparatus, " Pamphonic " reproducers and public address equipment, scientific instruments and the " Cathodeon " picture generator tube and special components.

Rediffusion, Ltd. (C 1527).—New products are the " Redifon " G49M marine radio telephone, the G37 transmitter/receiver, the G46 medium power marine transmitter and the G40 transmitter.

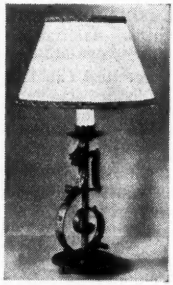
Reid & Sigrist, Ltd. (A 1116).—Of principal interest are a dynamic-balancing machine, and an optical projector and surface illuminator.

Salford Electrical Instruments, Ltd. (A 1119).—An exposure photometer, a universal photoelectric photometer, illumination meters, a decade switch, a slow-motion precision drive, quartz crystals, a miniature cathode-ray oscilloscope, precision dynamometer instruments and a radio sonde are some of the instruments shown.

Scientific Instrument Manufacturers' Association of Great Britain, Ltd. (A 1113).—A co-operative exhibit of eighty-eight member firms.

Scophony, Ltd. (A 1066).—Here can be seen a dynamic balancing machine, a high-power stroboscope, a " Skiatron " or dark trace cathode-ray tube, a range of electric motors, an impulse counter, television receiver and film editing projector.

Charles Selz, Ltd. (G 2063).—A complete range of table lamps, floor standards, wall brackets (illus.) and shades.



Hammered wrought-iron lighting standard (Charles Selz)

E. Shipton & Co., Ltd. (B 1464).—Telephones, intercommunicating loudspeakers, hearing aids, switchgear signalling systems and electrical timing systems.

Short & Mason, Ltd. (D 1688). — Indicators, recorders and controllers.

Siegrist-Orel, Ltd. (D 1667). — The " Orel-Baby " electric dry shaver and latex rubber cable sleeves.

Sigma Instrument Co., Ltd. (A 1074). — Measuring recording and control apparatus.

Smith's English Clocks, Ltd. (E 1749).—" Sectric " electric clocks include oak, walnut or plastic mantel models, low-priced alarms, impulse and synchronous slave clocks, turret clock movements, bell control clocks, time recorders and process timers.

Solus-Schall, Ltd. (D 1701).—Industrial and medical X-ray equipments, and electro-medical apparatus.

Standard Telephones & Cables, Ltd. (B 1439).—Telephone, telegraph, teleprinter and radio-communication apparatus.

Sterling-Croydon Clocks, Ltd. (E 1757).—Synchronous electric clocks and time switches.

Sterling Engineering Co., Ltd. (Earls Court 711).—The " Electrix " floor polisher, " Electrix Minor " vacuum cleaner and " Electrix Sturdust " hand vacuum cleaner are products on view.

Sunvic Controls, Ltd. (A 1041).—A high sensitivity recorder and a thermocouple controller are new products in a display of industrial and domestic control equipment.

Synchromatic Time Recording Co., Ltd. (E 1771).—Special attention is drawn to master clocks, time recorders and process timers.

Synchronome Co., Ltd. (E 1759).—In addition to impulse clock systems, time recorders, programme controllers and turret clocks, there are frequency checking equipment for generating stations and synchronous equipment for industrial and domestic use.

Taylor Electrical Instruments, Ltd. (C 1513).—A circuit analyser, a cathode-ray oscilloscope, 50-range universal meters, a resistance and capacity bridge and a megohmeter with a very high range are new items. Valve testers, " Taylor-meters," multiway switches, wire-wound potentiometers and moving-coil instruments are other exhibits.

Taylor, Taylor & Hobson, Ltd. (A 1030).—Electrical comparators and other measuring instruments.

Telegraph Construction & Maintenance Co., Ltd. (C 1524).—This exhibit includes thermostatic bimetals, "Telcoseal" glass sealing alloys, coaxial carrier frequency submarine telephone, anti-microphonic cable, high stability cable for centimetric wavelengths, h.f. therapy cable, double screened flexible cables, delay cables and "Telcothene" film, tubing and mouldings.

Thermega, Ltd. (D 1694).—Electrically heated blankets and pads include domestic, medical, ambulance and cot types. Cage heaters are also exhibited.

Thorn Electrical Industries, Ltd. (C 1528).—"Atlas" lamps and fittings include both incandescent and fluorescent types. "Mary Ann" domestic appliances and "Ferguson" radio receivers are also represented.

Victoria Instruments (E 1781).—Moving-coil and moving-iron measuring instruments, bridges and multi-range testing instruments are among the apparatus shown.

Waite & Son, Ltd. (F 1861).—Lighting fittings in all materials include the "Astra" range of plastic units.

Wego Condenser Co., Ltd. (C 1521).—Besides capacitors for radio and electronic purposes and power factor correction is a unit for photographic flash apparatus.

Westinghouse Brake & Signal Co., Ltd. (C 1531).—Metal rectifiers and battery chargers.

Woden Transformer Co., Ltd. (C 1535).—Amplifiers, transformers and chokes, together with a new combination radio-amplifier.

Woodmet, Ltd. (G 2030).—Electrical appliances.

Youngsigns, Ltd. (Earls Court 619).—Neon box signs.

B.E.A.M.A. Annual Meeting

Mr. E. C. Holroyde's Address

LAST week we summarized the annual report of the British Electrical and Allied Manufacturers' Association. In presenting the report at the annual meeting on April 18th, Mr. E. C. Holroyde, chairman of the Council, referred to the services rendered to the Association for over thirty-five years by Mr. V. Watlington, who recently retired from the directorship, and to the appointment of Mr. B. H. Leeson as his successor.

Industrial Recovery Prospects

Members of the Association, Mr. Holroyde said, were still beset by many problems. The recent crisis was a serious setback and a great effort was necessary to recover the position. Although the achievement and maintenance of full-scale production appeared to be some distance away, he saw no reason for lack of confidence in the industrial future of the country. Given the necessary leadership by the Government and industrialists we should regain prosperity much more quickly than many people anticipated.

Much time and thought were being given to nationalization schemes which should be devoted to production and the normal development of the industries concerned. The Council had given considerable attention to the Electricity Bill. Endeavours had been made to secure the acceptance of certain amendments, but without success except that the power of the Central Electricity Authority to manufacture for export had been excluded.

The electrical manufacturing industry did not fear any fair competition from the Central Authority because it was efficient, progressive and capable of meeting overseas as well as home demands. It could offer economic terms and experienced service that should discourage the Central Authority (as it had done the electricity supply undertakings) from embarking on manufacture.

Last year, Mr. Holroyde went on, he had mentioned the representations which had been made to the appropriate Ministries regarding the necessity for high priority for the heavy electrical plant industry. Little was done, however, until the recent crisis developed, since when urgent steps had been taken to overcome the hindrances, and representatives of the heavy plant makers and the director had been called into consultation with the Prime Minister and Ministers concerned.

After a reference to the establishment of a B.E.A.M.A. Export Promotion Department and other matters dealt with in the report, Mr. Holroyde announced the names of the newly-elected members of the Council for the 1947-48 session. They are W. H. Allen, Sons & Co., Ltd.; the British Thomson-Houston Co., Ltd.; Brookhirst Switchgear, Ltd.; Elliott Bros. (London), Ltd.; Ferranti, Ltd.; the General Electric Co., Ltd.; Hick, Hargreaves & Co., Ltd.; and the Micanite & Insulators Co., Ltd.

Presentation to Mr. Watlington

Upon the conclusion of his address Mr. Holroyde welcomed Mr. & Mrs. V. Watlington in felicitous terms and presented Mr. Watlington with a cheque as a mark of the members' appreciation of his long service with the Association. Mr. Watlington, in expressing thanks for the gift, said that he and his wife proposed to spend a month in Switzerland. Mrs. Watlington also made a brief acknowledgment of a bouquet handed to her by Mr. Holroyde.

NEW BOOKS

Power Plant Maintenance. British Patent Law.

Installation and Care of Electrical Power Plant. By "Engineer-in-Charge." Pp. 133; figs. 72. Emmott & Co., Ltd., 21, Bedford Street, London, W.C.2. Price 3s. 6d.

It is a pleasure to welcome the publication of this new work as a valuable guide for maintenance men. While its scope is too wide to justify expectation of detailed information, the book nevertheless covers the fundamental knowledge which should be at the finger-tips of all persons responsible for the satisfactory operation of electrical power plant.

The selection of the right type of motor for a particular purpose seldom receives sufficient attention and therefore the chapters dealing with speed and torque characteristics, as well as the various enclosures which are available for special applications should be of great assistance in filling a gap.

The chapter dealing with the practical implications of power-factor correction will no doubt enlighten many who have hitherto been unable to understand the true meaning of this term.

High-voltage switchgear and transformers should be accessible only to thoroughly competent engineers, for the purpose of effecting adjustments or repairs and this work should never under any circumstances be undertaken by any one who is not conversant with high-voltage apparatus. For this reason the chapter dealing with the subject would better have been omitted from a book of this sort.

Much more useful is the information contained in the chapters dealing with secondary switchgear and switchboards, while the chapters on a.c. motor starters and control gear, and the reversal of rotation of motors should be of special interest, as too often wrong connections are the cause of faults on newly installed motors. The numerous diagrams of connections for different types of motors given should help to obviate this trouble.—J. V. C.

Inventions, Patents and Monopoly. By Peter Meinhardt. Pp. 352; index. Stevens & Sons, Ltd., 119 and 120, Chancery Lane, London, W.C. Price 25s.

This book includes suggestions for reform based on those of instructed people, including the author. It is well documented with reference to the Patents and Designs Acts and to the literature of the subject and illustrated with examples, but is not burdened with case law and legal forms. The first part deals with inventors and inventions, the second with British law and practice, the third with abuse of patent monopoly, and part four with suggestions for patent law reform.

With truth the author says that profit is the main motive power of invention; the effect of invention is cumulative and may run ahead of practice. He explains how the inventive idea grows and the difficulties in the shape of industrial and public inertia which the inventor has to overcome. The various ways of rewarding inventors are discussed, including the arguments for and against the patent system and the historical note on the law is good. Succinct but good treatment is also given of the requirements of a valid patent and of the tribunals that deal with that form of property.

Careful explanation is given of the procedure on application, but more emphasis might well have been laid on the extreme importance of a well-drawn provisional specification. In addition it would have been well to warn inventors against delaying the drafting of their complete specifications until near the end of the statutory twelve months limit if they want corresponding foreigns. Fuller treatment of the Patents, etc., Emergency Act should also have been given. Its effects are likely to be felt for many years.

Applicants and inventors generally will find the information as to the cost of taking out a patent very useful, and also the data concerning maintenance, assignments and licences, the Royal Commission on Awards to Inventors, and income tax liabilities.

Clear warning is given of the high cost and uncertainty of patent litigation and an attempt is made to counteract the harm done by ignorant, prejudiced and partisan attacks on the patent system, which has helped to make us what we are—or were—industrially. The author states the excessive price case fairly and wisely subscribes to the view that industries are not based on unused patents.

He makes many stimulating suggestions for reform at the end. It is to be doubted, however, if his scheme for licence-patents and full-patents would work out in practice unless the Patent Office staff were to be largely increased. Before any report of value can be made on a patent specification it must be thoroughly examined. Experience of such documents shows clearly that nine times out of ten the invention cannot otherwise really be understood. Under the author's scheme this job would have to be done twice.

A word of praise is due to the author for the sympathetic comprehension which he shows of the employer-employee situation.—S. T. M.

Household Electricity. By J. F. K. Nosworthy (27 pp.). Staples Press, Ltd., Cavendish Place, London, W.1. Price 1s. 6d.

This is another of the handy booklets aiming at instructing the householder in the detection and rectification of faults. It is prefaced by a dissertation upon electricity, of doubtful value. We still think that it is usually better to call in somebody who knows the job if appliances go wrong.—J. H. C.

Views on the News

Reflections on Current Topics

THE healthy progress of the Institution of Electrical Engineers owes much to the vigour of its ultimate outposts, the Sub-Centres. On visiting the one at Rugby last week, it occurred to me that if anything like the same percentage of the membership attended meetings in London the accommodation problem would be insoluble. The Rugby membership is 400 and there were 123 present. While the latter included several visitors attracted by Dr. Read's rectifier paper and also by the lecture delivered in the afternoon at the B.T.H. works by Mr. J. R. Mortlock on systems and switchgear, the average reached for the session is not very far behind it, viz. 106. Of even better omen for the future is the keenness displayed by the Students' Section, as indicated by a 40 per cent average attendance in this its first year.

* * *

Far too much generating plant capacity is devoted to keeping water pipes from freezing during cold-snap peaks. This risk owes much to the general regulation that bars the taking of household supplies from pressure mains, thus necessitating cisterns. It seems likely that the regulation was originally made under a misapprehension of the nature of the diversity in the demand for water. Pipework in many existing houses probably would not stand up to pressure, but a suggestion in the *Economist* that pressure mains should be used for direct supplies in new houses (as is done abroad) has its electrical bearing apart from exorcising the burst-pipe bogey and saving building costs. Action could be extended to water heaters. The Building Research Board might well investigate foreign practice with a view to recommending improvements in methods here.

* * *

From the recent C.E.B. report, the Faraday Lecture lantern slides, and particulars given in this journal on February 14th, I have been endeavouring to deduce the effect on the demand of lowering frequency. The two main factors are the resistance load, of which the domestic and commercial load forms the bulk, varying with the square of the voltage, and the reactive load, consisting mainly of induction motors the speed of which falls with the frequency. The power taken by the latter, however, may vary directly, as the square or as the cube of the speed. Published particulars indicate that the overall effect on this mixed bag of allowing frequency and presumably voltage to drop correspondingly is that the national demand is proportionately less. There must, however, be considerable local departures from this straight-line law in view of the diversity of the plant electrified from district to district.

* * *

A novel use for old 100- to 200-W lamps as rough and ready fire extinguishers is mentioned in *Power*. After removing the cap, an opening in the centre of the bulb end, large enough to pour in carbon tetrachloride, is made with a pair of pliers. Softened sealing wax is pressed into the open base and heated so that it flows on to the glass and makes a liquid-tight joint. One or more of these bombs tossed into an enclosure are said to put out a fire very quickly.

* * *

In the *Electrical World* there appears a reproduction of a pictorial poster issued by the Los Angeles Department of Water and Power, warning boys of the danger of allowing their kites, with damp strings, to get across the power lines. The exact *modus operandi* is illustrated in four steps, culminating in the apparent death of the boy. While this may prove a warning it may also (if American boys are as curious as other boys) be an invitation to experiment.

* * *

The distinction of being the only person prosecuted under the Order prohibiting the use of electricity during certain hours was gained by Mrs. Doris Macintosh of Halifax. One can sympathize with her for she was endeavouring to dry out her furniture after it had been soaked by reason of a burst water pipe. Still five electric fires were rather a lot. As a charge of wasting electricity was dismissed it seems rather hard that Mrs. Macintosh had to pay a fine of £10 (with £3 15s. costs) for a "technical" offence which is now being withdrawn from the statutory crime list.—**REFLECTOR.**

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

ALADDIN Radio Patents, Ltd., and H. F. Garrett.—" Electrical conductors for high-frequency purposes." 19520. October 10th, 1944. (587045.)

Allmanna Svenska Elektriska Aktiebolaget. —" Linkwork for electric switches and other mechanisms." 23101/44. November 24th, 1943. (586985.)

Arrow Electric Switches, Ltd.—" Rotary magnetic switch." 23579/44. November 26th, 1943. (587059.)

Automatic Telephone & Electric Co., Ltd., and P. N. Roseby. — " Thermostatically-controlled electric heating equipment." 7643. April 25th, 1944. (586924.)

Automatic Telephone & Electric Co., Ltd., P. N. Roseby and R. D. Haigh.—" Electric boiling plates." 6414. April 6th, 1944. (586920.)

British Thermostat Co., Ltd., and J. E. Sherlock.—" Thermostatically operated electric switch devices." 19711. October 12th, 1944. (586983.)

British Thomson-Houston Co., Ltd.—" Electric welding apparatus." 20728/44. October 25th, 1943. (586940).

British Thomson-Houston Co., Ltd. (General Electric Co.).—" Electrical contact elements." 10825. June 5th, 1944. (586965.)

Callender-Suchy Developments, Ltd., and C. T. Suchy.—" Method of and means for metallizing electrically non-conductive threads." 20274. October 19th, 1944. (587046.)

A. Chadwick.—" Testing devices for electric circuits." 8768/44. June 11th, 1945. (587036.)

Chloride Electrical Storage Co., Ltd., and R. Gray.—" Electric accumulators." 28925. October 31st, 1945. (587066.)

Eaton Manufacturing Co.—" Space heaters of the type including thermo-electric generator." 10307/43. October 8th, 1943. (586993.)

English Electric Co., Ltd., and R. J. Welsh.—" Governing of free piston type internal-combustion compressors." Cognate applications 13743/42 and 13883/42. September 30th, 1942. (586989.)

General Electric Co., Ltd., and E. Eaves.—" Apparatus for heating rooms and like spaces." 1776. February 11th, 1942. (586949.)

B. H. Hornung and H. J. Fuchs.—" Snap action electric switches." 22608. November 15th, 1944. (586943.)

Jack & Heintz Research Corporation.—"Electrical snap action switches." 10884/44. May 10th, 1943. (586966.)

J. L. La Cour and M. Widakowich.—" Contact current changers for polyphase currents." 14589/44. July 17th, 1943. (587040.)

Landis & Gyr Soc. Anon.—"Prepayment apparatus for the supply of fluent energy." 2617/43. February 18th, 1942. (586990.)

Magnavox Co.—" Electric impulse generator." 10450/44. June 24th, 1943. (586928.)

Marconi's Wireless Telegraph Co., Ltd.— " Permeability tuning arrangements." 11165/44. June 11th, 1943. (586968.) " Phase modulated carrier wave receivers." 12039/44. June 24th, 1943. (587001.) " Radio antenna system." 5920/44. March 31st, 1943. (587071.)

Metropolitan-Vickers Electrical Co., Ltd., and W. H. Darlington.—" Combustion chambers for internal-combustion turbines." 23753. November 28th, 1944. (587083.)

Metropolitan-Vickers Electrical Co., Ltd., T. W. Ross, R. M. A. Smith and E. L. Thirlwell. —" Overload protective arrangements for dynamo electric machines." 19516. October 10th, 1944. (587016.)

Morecambe Electrical Equipment Co., Ltd., and O. Ellefsen. — " Electromagnetic switches." 85. January 1st, 1945. (587089.)

M-O Valve Co., Ltd., and A. H. Howe.— " Electron discharge devices." 14788. August 2nd, 1944. (586974.)

C. F. Neale and A. P. Fischer.—" Electroplating plant." 20593. October 24th, 1944. (587022.)

Philips Lamps, Ltd.—" Photo-electric indicating or control devices." 22059/44. January 10th, 1944. (587055.)

Radio Gramophone Development Co., Ltd., and E. T. Court.—" Control of electric currents flowing for short periods as in welding." 399. January 4th, 1945. (587104.)

J. Reed.—" Cathodes for electron discharge devices." 17649. September 15th, 1944. (587014.)

Standard Telephones & Cables, Ltd.— " Rectifiers." 20344/44. October 26th, 1943. (586984.) " Rectifiers and methods of making same." 20345/44. October 26th, 1943. (587020.) " Rectifiers." 22858/44. November 23rd, 1943. (587024.) " Electrophoretic coating of metal articles." 14022/44. July 23rd, 1943. (587039.) " Mechanisms for adjusting the relative angular position of interconnected shafts." 42/45. January 3rd, 1944. (587088.)

Standard Telephones & Cables, Ltd., and E. A. Richards.—" Mechanical rectifiers for electric alternating currents." 17483. September 13th, 1944. (586980.)

Telegraph Condenser Co., Ltd., P. A. Sporing and C. P. Johnson.—" Tubular containers for electrical condensers or other apparatus." 8679. May 8th, 1944. (587072.)

Metallurgy and Electricity

Some Recent Developments

By L. Sanderson

CONTINUOUS gauging with the X-ray micrometer is a recent development in rolling-mill practice, the thickness of sheet in motion being gauged with high sensitivity by a device that combines X-rays and electronic instruments. The method is applicable to the measurement of the wall thickness of long metal tubes at any point. For coated metals, the thicknesses of coating and base metal can be independently ascertained.

The possibility of employing a high-frequency oscillator whose output is determined by magnetic and eddy current losses as a means of making practical comparisons of stresses in metals has been studied. Preliminary experiments have established that there is a correlation between high-frequency core losses and internal stress. The method is considered as suitable for application to determining the optimum time of shot peening required to produce compressive stresses at the surface of bars subjected to fatigue and for predicting fatigue failures.

Nitriding of Steel

If a glow discharge is created in an atmosphere containing nitrogen, nitrogen ions with a positive charge will be attracted to the cathode at high velocity. This principle has been applied to the nitriding of steel. Specimens of chromium and chromium molybdenum steels have been made the cathode in a quartz cylinder held within a discharge tube. Current was supplied from a 110/5,000-V transformer, and ammonia was used as the source of nitrogen. The discharge tube was exhausted by a two-stage diffusion pump with an oil backing pump. The best results after several types of tests had been made were obtained when the current was strong enough for the specimen to be heated by the bombardment. Prominent corners and edges were uniformly nitrided by the glow-discharge process.

An advantage of employing frequencies in the 100,000 to 500,000 cycles per second range for induction hardening is the ability to concentrate heat in shallow surface layers. At 10,000 cycles, the theoretical penetration is 0·02 in. in steel, whereas at 375,000 cycles, it is reduced to 0·004 in. Another advantage is the ability to heat small diameters and thin sections, and a further one is that the energy can be transferred over greater distances from the coil to the metal.

A method of automatic welding has been developed for joining the seams of boxes made from 13-gauge steel sheet. The edges of the sheets are held in a jig, which also forms a vee-groove into which powdered flux is fed at the side of a guide wheel. Electrode wire is fed from a coil into the flux. The welding speed is approximately 120 in. per min, and the submerged-arc method is employed.

Detection of Flaws

Apparatus of British design, based on the reflection of supersonic waves, is now capable of detecting flaws in bars and billets within a region of from ½ to 12 in. from the surface. Separate crystals are employed for emitting the waves receiving the echoes, as contrasted with United States practice in which the same quartz crystal is used for both duties. In both designs the quartz crystal is in contact through an oil film with the bar to be tested and emits a few sound waves of extremely short wave length, which are reflected from the face of the bar furthest from the crystal. When the reflected waves strike the crystal, an e.m.f. is generated in it and the time of arrival is indicated on the screen of a cathode-ray oscilloscope. Any flaw causes part of the wave group to be reflected, and this echo arrives at the crystal before the echo from the opposite face of the bar. The time lag between the arrival of the two echoes indicates the distance of the flaw from the end of the bar.

Another recently introduced instrument is a cyclograph for testing the magnetic properties of steel bars. Using power-frequency a.c. at 110-V, it can be adjusted to pass currents at 2,000 to 150,000 cycles per second through the test piece.

Two new alloys for permanent magnets emanate from the United States. One is an alloy containing approximately 24 to 27 per cent nickel, 5 to 10 per cent cobalt, 6 to 8 per cent aluminium, 2 per cent titanium and the rest iron. The other comprises a hot-worked alloy of the following composi-

tion: 15 to 30 per cent nickel, 1 to 15 per cent cobalt, 4 to 9·5 per cent aluminium and from 1 to 3 per cent titanium, the balance being iron and minor constituents, of which carbon does not exceed about 0·25 per cent. Another American permanent magnet alloy contains 11 to 13 per cent cobalt, 16 to 18 per cent molybdenum, 0·5 to 1·0 per cent tungsten, 0·05 to 0·5 per cent chromium, a maximum of 0·04 per cent carbon and of 0·1 per cent silicon, 0·3 to 0·5 per cent manganese and the balance iron.

Smoothness is being measured in millionths of an inch by an instrument which "feels" for surface variations of this order and records them automatically on a paper chart. The recording pen is actuated by piezo-electricity. A diamond-tipped stylus rests upon the surface to be tested, and its movements are magnified as much as 100,000 times when transmitted to the chart, showing up any flaws plainly. The speed of the graph paper can be adjusted to indicate the pitch and depth of any surface irregularities. A small thermostat and heating unit, designed to keep the temperature of the piezo-electric crystal constant, uses nickel-chromium heat-resisting alloy and Invar 36 per cent nickel low-expansion alloy.

Magnetic-Power Methods

Another precision unit is a magnetic recorder which records sound impulses magnetically upon a continuously moving wire.

When a heavy a.c. from a transformer secondary is used as the magnetizing force in magnetic-power methods of crack detection, certain components so tested are sometimes found to have no residual magnetism. Consequently, there is some doubt whether accepted articles are magnetized and free from cracks and free from magnetism, but an instrument has now been invented for the simultaneous application of the detecting agent and the magnetizing current.

A magnetic balance has been devised for measuring the magnetic saturation of specimens weighing up to 100 g. With a supply of 1·8 kW it will produce a field of 56,000 gauss in a gap 1 mm wide and 10 mm in diameter. The Tysland Hole electric furnace for the manufacture of pig iron is an innovation of potential economic importance. The method of controlling the silicon by adjustment of the coke in the burden, which is applied in blast furnace practice, cannot be applied in the electric process, but silicon control by adjustment of the amperage to voltage ratio is possible. A full discussion of this method was given in *Schweizer Archiv*, 1945, Vol. 11, March, pp. 87-93.

A new device for eliminating static electricity from machines or moving materials has no moving parts or electrical connections, but is strip-shaped and has a radioactive surface, constituting a source of alpha radiation which ionizes the air within 3 in., permanently removing all static electricity in that area.

Checking Piston-Rings

A new electronic piston-ring tester, designed to eliminate the human error in checking piston rings, automatically inspects the truth of periphery and the width of gap of a specific size of ring. The piston ring to be tested is inserted inside a master ring of correct dimensional quality which is placed on the instrument table and rotated by a power-driven roller. Gauging is carried out by scanning beams of light directed on to photo-electric cells that energize electronic circuits to illuminate three signal lights. As the ring revolves, one beam of light is projected on the periphery of the ring. A clearance between it and the master ring results from any out-of-round condition of the ring, allowing part of the light beam to fall on the photo-electric cell. This cell operates a red rejection signal if an excessive amount of light indicates that the piston ring is out of round beyond an acceptable point.

If the periphery is within tolerance limits, a green signal flashes on at the end of a complete revolution if the gap width is also within tolerance, the beam of light being interrupted by a mechanical shutter as the gap passes this point. Another beam of light scans the width of gap, the photo-electric cell actuating a yellow signal if the gap is undersize. A third beam energizes another photo-electric cell set to illuminate the red rejection signal if the gap width is oversize.

A well known mine has abandoned compressed air as too expensive, and changed over to electrical operation of diamond-core drills for milling blast holes in greenstone. With a rotary speed of 1,200 r.p.m. and a pressure of 1,700 lb per sq in. on the drill bit, the present tools give penetration of 46 to 77 in. at much higher cutting rates, as against ½ in. per min and a life of only

6 min with percussion pneumatic drills with detachable bits previously employed.

Three electrodes, two carbon and one metallic, capable of producing five arcs in interconnected a.c. and d.c. circuits, are the basis of a new multiple arc-welding process for aluminium alloys, especially those of high strength that are difficult to weld. It allows of easy control and concentration of welding heat, so that aluminium sheet can be butt welded as thin as 0·016 in. without inert gas shielding and without a backing strip. The process is not expected to replace d.c. welding of the majority of ferrous metals, although it has been successfully employed on them, as it has for magnesium alloys, copper alloys, and nickel alloys.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

Engineering Calculations

IN his article in your issue of April 18th Mr. D. G. Sandeman suggests that a new unit of length should be introduced in order to get over a difficulty, which where it exists seems to be due to a weakness in fundamental principles.

Admitting that the unfortunate use of the word pound for both the unit of mass and the unit of force does cause a certain amount of confusion to some students, this confusion can be avoided by careful teaching. If the student in mechanics is taught from the beginning that the absolute unit of force is the poundal and is that force which acting on a *mass* of one pound produces an acceleration of one ft per sec per sec and that, in all problems involving force, mass and acceleration, if the mass is expressed in pounds and the acceleration in ft per sec per sec, then the result will be given in poundals, the difficulty should not arise. Since the engineer usually requires the force to be expressed in lb, the student should be taught that a force of 1 lb is equal to 32·2 poundals (or the corresponding value of "g"), and so he divides his result by 32·2 to bring it to lb, which once he understands what he is doing, he does all in one stage.

There is nothing really new in Mr. Sandeman's suggestion. Dr. C. V. Drysdale nearly forty years ago used to use what he called the "engineer's unit of mass," *i.e.*, the mass in pounds divided by "g" in order that the force in dynamical problems should be given in lb, and Mr. Sandeman's adoption of the unit of length equal to "g" ft has the same results as dividing the right-hand side of the fundamental equation by "g."

Most of the confusion in the minds of students over this matter appears to be due to two causes. One is that in the early study of mechanics, the branch of statics is frequently taught before that of dynamics and the distinction between the quantities mass and weight is ignored until the student comes on to dynamics, when to his alarm he learns that they are not synonymous terms. The other is the slipshod statements made in certain textbooks which sometimes cause one to wonder whether the author himself is too sure of his ground.

I do not think Mr. Sandeman has made out a good enough case for inflicting yet another unit on the long-suffering electrical student who must learn both mechanical and electrical units. Surely it would be better to teach him the fundamental difference between mass and weight at an early stage, and a little clear thinking will always show whether one has to divide by "g" or not.

Carlisle. J. F. PERRIN.

Export Trade Methods

REFERRING to the article by Mr. John C. Hancock which appeared in your issue of April 11th, this is certainly the first time I have seen it suggested that the business of a shipping and forwarding agent consists solely of filling in forms. It would be just as reasonable to argue that an accountant's work consists merely of writing pounds, shillings and pence in one or two columns, or that an insurance broker supplies an insurance policy. In fact, of course, one does not pay a shipping and forwarding agent for filling in forms any more than one pays an insurance broker for typing out a policy, or an accountant for writing down figures.

You pay for what the Americans, with their gift for apt expression, call the "know-how."

Your contributor puts his finger on the

spot—perhaps unwittingly—when he says that one of the two important factors to be borne in mind in the use of a shipping and forwarding agent is "whether the necessary staff is available to undertake the extra work involved." By "staff" he must imply capable staff. It is not an economic proposition to the overwhelming majority of exporters to employ the necessary qualified staff to enable them to get the best shipping service by attending to such matters themselves. It has been proved in many cases that it is much more economical to pay an agent a fee based on the freight or the volume of business than to attempt to do the business oneself with all the attendant expenses that would be involved.

The fact that many firms of shipping and forwarding agents have been in existence for over a hundred years and have staffs numbered in hundreds is clearly prima facie evidence that they must serve a useful purpose. This Institute alone has a membership of 1,300 agents and their staff.

Your contributor's reference to the advantages offered in connection with shipments to the Continent and Canada shows a partial recognition of the facilities made available. Had he a wider experience of the organization and ramifications of the profession I am sure he would better appreciate the vital part that the shipping and forwarding agent plays in the country's export trade.

London, E.C.4. A. E. REDFERN,
Secretary,
Institute of Shipping and Forwarding Agents.

Union and Institution

I AM particularly interested in your correspondent who felt compelled to admit, in your issue of April 4th, that he had come and seen but not conquered. He might well have added that he had failed to understand. It would be impertinent of me to assume the functions of the I.E.E. and inform this graduate member of the objects of the organization towards the cost of which his annual subscription of two guineas bears a fair share. It would suffice to refer to a letter appearing in the *Electrical Review* of March 21st, the contents of which he must have read but not noted.

The comparison of the annual subscriptions to the Institution and to the Electrical Trades Union may have monetary validity, yet the individual would find it difficult to define a common basis of valuation to himself of the services rendered by each organization. One can quite easily read into the letter a sense of satisfaction that 18s. 8d. per annum has been saved and yet, since the E.T.U. is an organization of social beings, I can only hope that the future will not disabuse him too violently.

In the higher sphere of activity in the electrical industry which a graduateship may help him to attain, trade protection will again be necessary. An annual subscription to the appropriate association will then, together with that to the Institution, bring the cost of services covering his economic life well above the £3 0s. 8d. paid to the E.T.U.

Membership of the Institution, although it gives technical and professional status to the individual, does not in itself resolve the economic contradictions in which he finds himself involved. The trade union was the first attempt to solve these organizationally, and the fact that professional associations lagged behind the unions was largely due to a mistaken conception of the individual's power to make Society correctly evaluate his services. It is this fact which your correspondent seems to have overlooked and which, I feel certain, he will have to learn.

Whaley Bridge, E. W. BUSSEY,
Stockport, Ches. *General Secretary,*
Electrical Trades Union.

Fuse Specifications

THREE important specifications have recently been published. The main feature of B.S.88, which is a revision of the well-known 1939 edition, is the inclusion of a number of appendices to assist the user to understand all the implications of the main document, which is somewhat technical. Useful information has also been included on the selection and application of fuses. Hitherto it has not been possible more than to mention in a footnote the chance of fuse failure at moderate overcurrents and other values less than their rated breaking capacities, without being able to specify tests for such weak ranges.

The other two specifications relate to cartridge fuses for use in "consumers' units" in dwelling houses, blocks of flats and office buildings. B.S. 1361 standardizes four sizes of 5, 15, 30 and 60 A ratings with dimensions arranged to render them interchangeable (not so when their ratings differ) with cartridge links designed in 3, 7 and 13 A sizes (B.S. 1362) to fit into fused plugs and shuttered socket outlets complying with the new (B.S. 1363) requirements. Copies of these specifications are obtainable for 2s. each from the British Standards Institution, 28, Victoria Street, London, S.W.1.

COMMERCE and INDUSTRY

Electrical Employment. National Radio Exhibition

FIGURES published in the March *Ministry of Labour Gazette* show that there were 158,800 insured persons employed in the electrical engineering industry in January last; this was 300 fewer than in December (159,100). The number engaged in electrical wiring and contracting was 54,700 (against 54,800). On the other hand the number employed in apparatus, cable and lamp manufacture increased on the month from 266,800 to 272,300. The accompanying table indicates the number of male and female employees in each group, and gives a comparison with mid-1939 and mid-1946.

Employment During January, 1947 (Thousands)

Branch	Males (14-65)			Females (14-60)			Total		
	Mid-1939	Mid-1946	Jan., 1947	Mid-1939	Mid-1946	Jan., 1947	Mid-1939	Mid-1946	Jan., 1947
Electrical engineering ..	105·9	99·9	106·4	28·0	53·2	52·4	133·9	153·1	158·8
Electrical wiring and contracting	38·9	45·5	49·4	2·8	5·4	5·3	41·7	50·9	54·7
Electrical apparatus, cables, lamps, etc.	116·4	117·4	137·9	79·5	126·8	134·4	195·9	244·2	272·3

"Radiolympia" Arrangements

Plans are being proceeded with for the first post-war National Radio Exhibition (the fifteenth of the series) at Olympia from September 30th to October 11th. The display, which is being organized by the Radio Industry Council, will be much wider in its scope than in previous years: it will embrace not only broadcasting and television reception, including components and accessories, but also transmission and communication equipment, radar, and the latest applications of electronics for civilian, commercial and industrial use.

Space in the exhibition will be allotted by ballot and applications for inclusion in the ballot must be sent to the Radio Industry Council, 59, Russell Square, W.C.1, by May 31st.

Lamp Packing Material

There is still a great shortage of lamp packing material and the Government has asked the electric lamp industry to continue to make the utmost economies. All empty outer containers should be preserved and returned either by rail, carriage forward, or by handing them to the lamp manufacturers' carmen.

Shock at 60,000 V

George Dinnell, labourer, of Bootle, who recently received an electric shock at 60,000 V, gave evidence at Bootle on April 22nd when Williams, Harvey, tin smelters, of Bootle, were fined £10 with 17s. 6d. costs for an offence under the Factories Act Electricity Regulations. The prosecution alleged that the firm did not have certain electrical equipment safeguarded in such a way as to prevent danger, with the result that Dinnell was injured. Mr. C. Gourly said that Dinnell put his foot on a steel box. The plate, which was rusted and only of paper thickness, gave way and his foot contacted an electrical condenser carrying 60,000 V. A workman came to his aid, but Dinnell with great presence of mind told him to go and switch off the electricity. The injured foot was badly burned and had to be amputated. In the prosecution's submission the steel plate should have been covered with a grating. Dinnell, in evidence, said that although there was a "Death instantaneous" notice with skull and crossbones nearby, he was not aware that it referred to the steel boxes over which he was walking. He considered it his duty, as a labourer, to find a certain switch and put it on for the workmen. The firm, who pleaded not guilty, were represented by Mr. J. S. Watson, who said that reasonable and practicable measures had been taken to prevent danger.

Private Diesel Plants

Referring to the official encouragement which is being given to the release of materials for the production of small industrial power plant, Davey, Paxman & Co., Ltd., state that they have instituted a comprehensive manufacturing programme covering Diesel engines and generating sets from 65 to 330 kVA. The total capacity of generating sets completed or in hand under the emergency programme is said to be about 150,000 kVA, apart from non-electric units.

Consumers' Records

Mr. F. J. Elliott, borough electrical engineer of Wolverhampton, informs us that his undertaking is extending a Powers-Samas record system installed in 1937. The new 65-column equipment will provide, inter alia, an analysis of consumers' consumption and revenue by type of supply, type of charge, type of premises, road, district, parish and any selected area.

The machines will sort at the rate of 24,000 cards per column per hour and tabulate the

results of the sorting at the rate of 4,800 per hour. By this means the cards relating to the whole of the consumers of the undertaking can be sorted in any desired manner in a few hours, and the information can be tabulated and available for use in a few days. The information obtained, coupled with technical data gathered in the field (maximum demand on sub-stations, feeders, etc.), will enable additions and extensions of the distribution system to be designed in close relationship to the needs, thus avoiding unnecessary capital expenditure. When periodical changing of meters becomes compulsory these machines will be used as a means of sorting and extracting meter records under eight headings.

Magneto Dimensions

Revised overall and fixing dimensions of four types of unscreened magnetos (not for aircraft) for base and spigot mounting on automobiles are set out in B.S. 5027. Tolerances applicable to those dimensions which affect interchangeability and the sizes of tapers and keyways are included. Similar details are given in the new B.S. 1368 with respect to combined dynamo and magneto sets, double spindle type; combined generator and ignition units, single spindle type; combined dynamo and engine speed contact breaker unit and dynamos for use on motor cycles.

These specifications are obtainable for 3s. 6d. each from the British Standards Institution, 28, Victoria Street, London, S.W.1.

Tungsten Ore Price

The Ministry of Supply announces that as from April 23rd, the price of tungsten ore of standard grade from Government stocks will be 115s. per unit of WO_3 delivered consumers' works. For special high grade scheelite to the following specification—WO_3 minimum 68 per cent, tin maximum 0·60 per cent, arsenic maximum 0·10 per cent, molybdenum maximum 0·10 per cent, the price will be 120s. per unit WO_3 delivered consumers' works. Inquiries should be addressed to Ministry of Supply (M2), Shell Mex House, Strand, London, W.C.2.

Simplex Conference

The Tube Investments subsidiary, Simplex Electric Co., Ltd., held a conference of its branch managers at its new Blythe Bridge factory, near Stoke-on-Trent, on April 18th. The delegates were welcomed by Mr. C. Lacy-Hulbert, managing director, who stated that, with the addition of the Blythe Bridge factory, the Simplex Co.'s factories now totalled over one million square feet of factory floor space. The delegates were then addressed by Mr. F. G. Nesbitt, director, Mr. F. G. Arnott and Mr. E. G. Plucknett, general sales managers, and the various departmental managers on the subjects of general policy, production, and post-war development. After lunch the delegates toured the factory under the guidance of Mr. H. H. Aston, director and general works manager of the Blythe Bridge factory. When the conference resumed after tea, addresses were given by Mr. A. C. Smith, director, Mr. J. M. Surrall, general commercial manager, and other members of the staff. In the evening the delegates were entertained by the directors to a dinner held in the factory canteen.

Henley's in Wartime

The North Woolwich works of W. T. Henley's Telegraph Works Co., Ltd., were particularly vulnerable to air attack during the war, and considerable damage was done to buildings and plant, but production continued. The damage, however, however, reached such serious proportions that eventually it was necessary to transfer the manufacture of winding wires, aerial and switchboard cables and certain other operations to the company's Gravesend works. The head offices at Holborn Viaduct were destroyed in an incendiary attack and the wartime offices at Milton Court suffered from blast. In addition several other branch premises were damaged. Despite all these handicaps the work of production went on. In common with other engineering concerns the works were given over to production of war equipment. Such matters as Operation "Pluto," the defeat of the magnetic mine, and the value of radar are now historical facts and to each of these Henley's made an important contribution, in addition to its numerous other war activities. In "The Story of Henley's in War-Time," which the company has just published, there is a brief but excellent account of its war contribution, with numerous illustrations showing some of the work carried out.

Electrical Wholesalers' Federation

The annual meeting and luncheon of the Electrical Wholesalers' Federation will be held on May 15th, at the Savoy Hotel, London, W.C.2.

Middlesbrough Purchasing Decision

Middlesbrough Town Council has considered the question of obtaining its electrical supplies direct from the manufacturers, but has decided in the meantime to continue the present system of getting them through wholesalers.

Film Studio Equipment

Mercury arc rectifier plant is among a comprehensive range of equipment being supplied by the General Electric Co., Ltd., to Alliance Film Studios, Ltd., for their Riverside, Twickenham and Southall Studios. The plant comprises two 500-kW equipments and will provide a 240/120 V, three-wire d.c. output, the incoming supply from the Hammersmith Corporation being at 11,000 V, three-phase 50-cycles. The G.E.C. is also providing the h.v. switchgear and d.c. output control gear. The middle wire

120-V d.c. output is provided by means of automatically controlled rotary balancers. Voltage is automatically controlled by means of self-adjusting induction regulators. Special attention has been paid to the smoothing apparatus to exclude any interference from ripple at the arcs, either for black and white photography or for technicolour. Among the other equipment which has been supplied are 150 2-kW studio spotlights, 32 500-W spotlights, broadside floodlights, fully collapsible type geared stands and 5-kW focusing spotlights. The company is also supplying its new 150-A double-negative H.I. arc lamps and 2½-kW compact source studio "floods."

Central Board's Report

The price of the nineteenth annual report of the Central Electricity Board, particulars of which appeared in our last issue, should have been given as 1s. net. To the caption to Fig. 2 should have been added: A = average cost of fuel per ton delivered; B = average fuel cost per kWh sent out; C = average fuel consumption per kWh sent out.

Boiler-Works Lighting

Improved lighting has recently been installed in the engineering and boiler making works of Robert Jenkins & Co., Ltd., Rotherham. Plans for the installation were prepared by lighting engineers of the British Thomson-Houston Co., Ltd., and the electrical contractor was L. R. Smith, Rotherham.

The existing lighting in the works had an average intensity of 5 to 10 ft-candles with glare from bare and insufficiently screened high-wattage lamps. The new installation has made a striking improvement in overall illumination and gives glare-free lighting upon every working plane.

In No. 1 Shop, plating, shearing, drilling and oxy-cutting are carried out together with the erection and welding of small and medium size fabricated articles up to 5 tons. Twenty-six 500-W "Mazdalux" dispersive reflectors with glass covers have been mounted at intervals of 27 ft by 16 ft at a height of 20 ft, giving a service intensity of 13 ft-candles. The erection, welding, fettling, testing and painting of general mild steel fabricated work up to 2 tons is carried out in No. 6 Shop. Here, thirty similar units have been installed at a mounting height of 19 ft 6 in. The reflectors are in two rows at intervals of 21 ft by 20 ft and the resultant service intensity is 8·5 ft-candles. There is a service intensity of 8 ft-candles in No. 8 Shop where twenty-nine 500-W dispersive reflectors are mounted at a height of 28 ft 6 in. with staggered spacings of 32 ft by 20 ft. No. 10 and No. 11 Bays, the main plating bays for all the erecting shops have twenty-four 1,000-W "Mazdalux" concentrating reflectors mounted 28 ft 6 in. above floor level in four rows at intervals of 20 ft. by 20 ft. This arrangement gives a service intensity of 11 ft-candles. Three 200-W reflectors provide local lighting for a plate edging machine.

Water Heater Prices

The Electric Water Heater Manufacturers' Association announces that as a result of arrangements made with the Commissioner of Customs and Excise, the purchase tax on electric water heaters is chargeable at the following rates:—Thermal storage type up to and including 30 gal capacity (including dual heat water heaters), 55 per cent of current list price; immersion heaters and circulators up to and including 3-kW loading, 50 per cent of current list price.

Electric Vehicle Display

A display of "Douglas" electric vehicles was opened last week at the showrooms of Hovis, Ltd., at 40, Rushey Green, S.E.6, by Locomotors, distributors in the London area for Douglas (Kingswood), Ltd., of Bristol. The exhibition includes two types of "Douglas" 10/15-cwt vehicles, suitable for bakery and general purposes, and a 20-cwt vehicle suitable for dairy and greengrocery work. Two of these are shown in the accompanying picture. The exhibition ends to-day (Friday), and will tour other distributors' showrooms of Douglas (Kingswood), Ltd., first visiting Reading and later proceeding to Oxford, Belfast, Glasgow and Edinburgh.

Two of the "Douglas" electric vehicles shown at Catford

Batti-Wallahs' Society

The Batti-Wallahs' Society departed from custom at its luncheon last week by introducing a lady as its principal guest, and the invitation to Miss C. Haslett, Director of the E.A.W. was a happy one. The luncheon was preceded by the induction of the new president, Col. H. J. Wellingham, by Mr. P. V. Hunter, the retiring president.

Miss Haslett in her address said that she did not intend to talk about electricity in the home

to men who were already well acquainted with the subject and she therefore proposed to tell some of her amusing experiences in her travels during the war. It was as a result of her visits abroad that the idea came to her that other British women should have the opportunity of meeting people and studying methods in other lands. When the E.A.W. celebrated its twenty-first anniversary and it was felt that the event should be commemorated, she expressed the desire that the Caroline Haslett Trust should be instituted to give other women the opportunity of travelling abroad. It was appropriate that the first winner of the Travelling Exhibition in Electrical Housecraft under the Trust should be Miss Joan Whitgift, daughter of Mr. M. Whitgift, hon. secretary of the Batti-Wallahs' Society, who recently visited the United States. The next winner of the Travelling Exhibition would be going to Sweden.

Institute of Welding

By arrangement with the Tyneside and Tees-side branches, the Institute of Welding is to hold an extended meeting on the North-East Coast from June 3rd to 6th. A number of papers and visits have been arranged.

The annual dinner of the Institute is to be revived this year. It will be held at Grosvenor House, London, W.1, on June 25th, the price of tickets being 30s. 6d. (exclusive of drinks).

House-Service Panel

The width of the house-service intake panel (South Wales Switchgear, Ltd.) described in our issue of April 11th (p. 591) is 1 ft 9 in.—not 11 ft 9 in. as stated.

Steel Production

In a statement to the Press on Monday last Sir Archibald Forbes, chairman of the Iron and Steel Board, said that last year, to meet a demand for 15 million ingot tons of steel about 12¾ million tons had been produced. The output would have been higher but for shortages of fuel and transport facilities. But for the lack of coal, production would have reached 15 million tons this year. The employment of electric furnaces to manufacture carbon steel (which, he said, was not generally economic) had been impeded by the shortage of power.

Trade Publications

General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.—Illustrated catalogue (F (3) section) with revised price list (F. 40) of glassware and fancy shades for electric lighting.

G.M. Engineering (Acton), Ltd., Standard Road, North Acton, London, N.W.10.—Illustrated folder on B.B.T. busbar trunking for overhead distribution of power in factories.

"Monitor" Patent Safety Devices, Ltd., King's Road, Wallsend-on-Tyne.—Leaflet (No. 114) illustrating alarm controls for oil engines.

Johnson, Matthey & Co., Ltd., 73, Hatton Garden, London, E.C.1.—Data list (Pub. No. 1760) with separate price list of standardized substances for spectrography, chemical analysis and research.

Engineering & Export Co., Ltd., 2, Regent Street, Birmingham, 1.—Leaflet illustrating the many uses of "Universa" local lighting fitting.

Lee Products (Great Britain), Ltd., Radio House, East Street, Brighton, Sussex.—General catalogue and price list (No. G./6) of radio and electrical accessories.

Andre Rubber Co., Ltd., Kingston By-pass, Surbiton, Surrey.—Collection of reprints on industrial uses of rubber and rubber bonded to metal.

W. C. Davey & Co., 180, Tottenham Court Road, London, W.1.—Illustrated leaflet (No. 124) on luminous signal signs for offices.

Bathroom Fatality

A bathroom fatality of an unusual character is reported by the *Daily Mail.* Power wires from the bathroom to a garden workshop ran near a metal window and it is believed that the victim, a man of thirty-three, stood up in the bath to close the window and received a fatal shock.

Trade Announcement

Bennie Lifts, Ltd., announce that their sheet metal department has been transferred to Glasgow Terrace, 111, Grosvenor Road, S.W.1 (telephone, Victoria 5914-5). The department is under the management of Mr. C. A. McAuliffe.

Trade Marks

THE following applications have been made for trade marks. Objections may be entered within a month from April 23rd :—

AUTOMAGIC. No. B639,395, Class 7. Automatic machines for clothes washing, dish-washing and ironing.—Electric Household Utilities Corporation, 54th Avenue and Cermak Road, Chicago. Address for service: c/o Stevens, Langner, Parry & Rollinson, 5-9, Quality Court, Chancery Lane, London, W.C.2.

WAVOX. No. 644,138, Class 9. Radio receiving and transmitting apparatus, and parts thereof not included in other classes, electric batteries, accumulators, switches, terminals, coils, vacuum cleaners, bells, chimes, fire alarms, measuring instruments and apparatus for household purposes (not included in other classes).—A. H. Alexander, 24, Davyhulme Road, Davyhulme, Manchester.

ULTREX. No. 640,237, Class 11. Arc lamps (not for surgical or curative purposes); and carbons for arc lamps.—National Carbon Co., New York. Address for service: c/o Marks & Clerk, 57-58, Lincoln's Inn Fields, W.C.2.

COMMANDO. No. 642,785, Class 11. Gas and electric heating appliances.—Twiggs (Northern), Ltd., Sunniside Works, Pallion Trading Estate, Sunderland.

ELECTRICITY SUPPLY

Belfast Steel Allocation. Portobello Station Reconstruction.

Belfast.—POSSIBLE DELAY.—Difficulty has arisen with regard to the supply of steel required for the plant for the Harbour power station extensions and for extensions of the transmission system. Mr. W. Girvan, the city electrical engineer, has reported that the quantities allocated by the Ministry of Supply are totally inadequate and if more steel is not obtained there will be grave delay in the completion of the extensions. Mr. Girvan has been instructed to approach the Northern Ireland Ministry of Commerce to submit the Electricity Department's case to the Ministry of Supply. It is reported that the Metropolitan-Vickers Electrical Co., which is providing generating plant has informed the Department that it will be necessary to postpone the commissioning date from August, 1948, to January, 1949, owing to difficulties in obtaining materials and labour.

Brighton.—NEW SUBSTATIONS.—It is proposed to erect and equip five substations for the purpose of serving the Lower Bevendean estate.

Carlisle.—EFFECT OF ANTI-FLOOD SCHEME.—When a proposal by the River Eden Catchment Board to lower the river bed at Willow Holme and erect a 5-ft weir to stop flooding was discussed at a meeting of the Eden Fishery Board it was stated that if the river were lowered in this way there would be insufficient water in the dry season for the Carlisle generating station. An alternative recommendation that the intake at the electricity works should be lowered would be very expensive, it was stated. A meeting is being arranged with the Catchment Board and a Ministry representative to discuss the matter.

Croydon.—OPPOSITION TO BILL.—The Electricity Committee reports that Counsel's opinion has been received to the effect that beyond continuing its opposition to the Electricity Bill in its progress through Parliament there is no action which the Corporation can take to resist the acquisition of the electricity undertaking.

Dartford.—ELECTRICITY FOR ESTATE.—The Corporation is to spend £5,218 on the provision of a supply of electricity to the Temple Hill housing estate.

Dorchester.—FLUORESCENT STREET LIGHTING.—The Corporation is to consider the possibility of introducing fluorescent lighting for streets in built-up areas, with a view to reducing accidents.

Edinburgh.—MODERNIZATION OF PORTOBELLO STATION.—Councillor Walter Gerrard, convener of Edinburgh Corporation Electricity Committee, and Bailie J. M. Airlie, chairman of the Public Utilities Committee, on Thursday last week loosened a nut on a 25-year-old turbine at Portobello power station to inaugurate the £10,000,000 modernization scheme. Plans by Mr. J. F. Field, the city electrical engineer and manager, aim at a large saving in capital cost by reconstructing the existing station rather than building a new station.

Hull.—OUTPUT IN 1946-47.—During the year ended March 31st last the output of electricity at Hull was 447 million kWh. The requirements of the Hull undertaking totalled 382 million kWh, an increase of 67 million. Reporting this at a meeting of the Electricity Committee the general manager (Mr. D. Bellamy) said that notwithstanding the advance in the price of coal the cost of production per kWh had been reduced.

Liverpool. — RESTRICTIONS AND FIXED CHARGES.—In a letter to the city electrical engineer the secretary of the Crosby Chamber of Trade referred to the hardship caused to traders by cuts in electricity while no adjustment was made in charges under contracts which guaranteed a certain minimum payment. The electrical engineer (Mr. J. Eccles) replied that if the fall in usage was such as to make any other appropriate tariff cheaper the consumer would be given advice. The Department was prepared to investigate any real case of hardship, but no general reduction in charges was contemplated.

London.—POWER STATION EXTENSIONS.—The Technical Committee of the London and Home Counties J.E.A. reports that it has no observations to offer upon the application of the Kent Electric Power Co., to the Electricity Commissioners for consent to the installation of two 60,000-kW turbo-alternators and four 360,000-lb-per-hour boiler units, etc., at the Littlebrook power station. The same applies to the application of the Fulham Corporation for consent to the replacement of a 10,000-kW Brush set by a 60,000-kW turbo-alternator at the Townmead Road station.

Middlesbrough.—THORNTREE ESTATE SCHEME.—The Town Council has applied for sanction to borrow £43,000 for electrical work on the Thorntree estate.

SCHEME POSTPONED.—A £3,500 scheme for supplying electricity to Stewart Park is to be postponed.

ONE METER ONLY.—The Town Council has agreed to a proposal by the borough electrical engineer for the electrical wiring of houses through one meter. The saving per house is £3 and the total saving over a period of seven years will be £16,500.

Nottingham.—REPAIRING FLOOD DAMAGE.—The Electricity Department has removed, dismantled, cleaned and reassembled 2,328 meters since the floods in the city. The final total, reports the city electrical engineer (Mr. M.

Wadeson) is likely to be about 2,500. He said that 457 meters were removed from threatened houses before the Trent overflowed and the supply was left on. Short-circuiting by the flood water in houses caused a heavy leakage of current and some services were burnt out because of arcing at water level. Eighty of the services had had to be completely renewed and a large number of others partly so. Most of the cookers affected had been reconditioned and others were being done at the rate of five a day. Altogether, the Department had had an immense job to tackle and serious and unusual difficulties to work against.

Oldham.—EXTENSIONS.—The Electricity Committee proposes to supply electricity to Lily Mills and to seek sanction to borrow £160,000 for provision of additional electricity supplies in the Crompton and Royton districts.

Scotland.—TUMMEL-GARRY SCHEME.—The inauguration of the Pitlochry dam and power station works of the Tummel-Garry project, one of the major undertakings of the North of Scotland Hydro-Electric Board, took place last Friday. The Countess of Airlie performed the ceremony when she set in motion the concrete mixer which turned out the material for the first block to be built into the dam. Speaking after the ceremony, Mr. Tom Johnston, chairman of the Board, said that if they had been allowed to start their schemes four years earlier they might to-day have been contributing 500,000 kW to the grid, equal to 1,050,000 tons of coal saved per annum. The Sloy, Tummel-Garry, Fannich, Affric, and Shira schemes together would generate about 830 million kWh per annum, or between one-quarter and one-fifth of the total electricity required in Scotland to-day. Eventually they would produce one-seventh of the total demand in Great Britain. Mr. Johnston paid tribute to Lord Airlie, his predecessor as chairman, for his resolution and far-sightedness during the early and difficult days of the Board.

Shoreditch.—DISTRICT HEATING.—A report has been prepared jointly by the borough electrical engineer and manager and the borough surveyor on the whole question of district heating, with particular reference to its possible application to the new buildings to be erected in the planned re-development areas of the borough. The Council has authorized that proposed blocks of flats, etc., in which individual central heating plants are to be installed shall be so arranged that the plants can be shut down and connections conveniently made to heat transmission pipes, in the event of any scheme of district heating being provided.

COAL CRISIS.—In order to assist in the national effort to save fuel, the old Belliss & Morcom reciprocating engines coupled to d.c. generators, which were installed about 48 years ago, are being run again from steam provided from the burning of refuse at the dust destructor plant at Coronet Street, and the electricity generated is being fed directly into the d.c. low-voltage distribution system.

Stoke Newington.—SUPPLY TO FLATS.—Referring to the erection by the London County Council of a number of blocks of flats on the Woodberry Down housing estate, the Stoke Newington Electricity Committee reports that the l.v. mains network has been designed with feeder cables from the substation to feeder unit assemblies erected in selected main intake positions in the flats, and thence the service cables radiate to the flats supplied from the respective feeders. An alternative feeder has now been provided to all main intake positions. In this connection the Committee proposes to apply for sanction to borrow £15,750 for laying mains by direct labour. It is thought that the maximum load for the complete estate will be approximately 5,000 kVA and the erection of four substations is proposed. Loan sanction is being applied for to cover an expenditure of £8,500 on the laying of 11-kV and cable.

Commissioners' Statistics

FROM the Electricity Commissioners we have received a statement upon the consumption of electricity during the past twenty-seven years, showing the estimated proportions taken by various classes of consumer. From these statistics we have taken the consumptions in millions of kWh for 1920 (the first year given), 1930, 1940 and last year.

Calendar year	Domestic and farm premises	Shops, offices and other commercial premises	Factories and other industrial premises	Public lighting	Traction	Total
1920	297	398	2,545	48	419	3,707
1930	1,531	1,315	5,353	161	809	9,169
1940	6,230	2,997	13,866	17	1,146	24,256
1946*	11,210	3,901	17,916	260	1,370	34,657

* Subject to revision.

Supplementing the information given in Table 49 (B) of the "Return of Engineering and Financial Statistics relating to Authorized Undertakings in Great Britain for the Five Years 1938–39 to 1942–43" (*Electrical Review*, December 6th, 1946), the Electricity Commissioners state that the salaries and wages charged to revenue account by public authorities (exclusive of the Central Electricity Board) and companies were divided as follows:—

Year	Public authorities	Companies
	£	£
1938–39	11,428,563	6,095,004
1939–40	12,876,509	6,640,670
1940–41	12,862,539	7,072,456
1941–42	13,585,777	7,674,487
1942–43	14,507,006	8,418,415

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

A **Reyrolle & Co., Ltd.,** held their annual meeting on April 22nd when Mr. G. Wansbrough (chairman) referred to the resignation of Col. Leeson, managing director, who had been appointed Director of B.E.A.M.A., and the appointment of Mr. H. Towers as a director and general manager of the company. Referring to the company's activities during the year under review, the chairman said that with the end of the war it had become necessary to replace much equipment which had completed its normal life. Fortunately it had been possible to take over much of what they required from Government ownership at reasonable prices. The output of the company for last year was, in terms of value, about 10 per cent higher than for the previous year. The total output of Reyrolle's and the associated companies in which they owned not less than 50 per cent of the ordinary capital was £6¾ millions as against £6 millions for 1945. Reyrolle's orders at present in hand stood at a higher level than ever before in its history. Since the acquisition of an interest in Morphy-Richards, Ltd., they and Reyrolle's had co-operated in the design of a new vacuum cleaner, which would be made by Reyrolle's at the Ashington factory and distributed by Morphy-Richards. Plans were far advanced for converting Morphy-Richards into a public company and offering a portion of its capital to the public.

The Telegraph Construction & Maintenance Co., Ltd., held its annual meeting on April 22nd when Lord Colgrain (chairman) said that it was not yet possible to ascertain with any accuracy the loss which the company had incurred through the fuel crisis when the works were completely closed for three weeks. The change-over to peace conditions involved careful rearrangement throughout the factories and for the first six months of the year it was not possible to do more than cover expenses. After July things began to improve; they recovered many of their old clients and found others. They developed new lines of manufacture in plastics and certain high grade magnetic metals, and rebuilt their order book, which was now most satisfactory in every branch. Owing to an acute shortage of fine wire-drawing facilities, they had recently acquired a controlling interest in a factory which specialized in this class of work. They were also installing a plant for the drawing of fine copper wire to meet their own demands.

In to-day's sellers' market, prices in many instances were fantastic and all customers asked for was early delivery. This situation could not continue indefinitely and when changes came it would be important that a factory should be equipped to make those things, and those only, which it could produce most efficiently, and be able to sell in competition with others.

Associated Electrical Industries, Ltd.—In the course of his speech at the annual meeting held on April 23rd, Mr. O. Lyttelton (chairman) said the orders on the books of the group were the largest ever recorded in the history of the company. To increase the space and labour available for the manufacture of heavy plant at Trafford Park, they had transferred part of the meter department to a temporary plant at Bury. This department, however, would be permanently transferred to a new factory of about 300,000 sq ft at Motherwell, and some other activities would also be concentrated in the same plant. They had also leased a plant at Llandudno Junction, which would be used in the manufacture of commercial refrigerators, amongst other products. Under the auspices of the Cosmos Manufacturing Co., production had started at Sunderland in the manufacture of radio valves, and under Harcourts, Ltd., light equipment and domestic appliances were being produced at Hereford.

Referring to generating plant, the chairman said that in order to accelerate the building of power stations the Government must set up some clearing house or improved administrative machinery to clear the projects through the eight different public authorities which were concerned. At present it took nearly a year to get the site and project approved. The provision of coal-handling and steam generating plant must be kept not only in step but slightly in advance of the electrical part of the work.

The M.-V. Co. had in hand four more 30,000 kVA synchronous condensers for export, and the B.T.H. Co. had an order for a continuous wide-strip mill drive for cold rolling of aluminium. The driving motors developed 8,600 H.P., the highest so far used for this type of drive in Great Britain. Many ships had been fitted with radar sets produced by the M.-V. Co. and the B.T.H. Co., and radar equipment was being installed in the *Queen Mary*. Both were studying the use of gas turbines for peak loads at power stations, and the M.-V. Co. was developing and manufacturing, in collaboration with the G.W.R., a gas turbine electric locomotive for hauling express passenger trains up to 90 m.p.h. The B.T.H. Co. was active in the field of industrial electronics, and had also received large orders for sound projectors.

The majority of electrical traction equipment on order was for export and included a large number of M.-V. 2,500-H.P. 3,000-V locomotives and motor coach electrical equipment

for the South African railways. Large orders for railway signalling equipment had been placed with the company's subsidiary. Further substantial orders had been received by the B.T.H. Co. for control equipment for rolling stock, notably for the L.P.T.B.

Great progress had been made in the development of fluorescent lamps and lighting. The Edison Swan Electric Co. had been fully employed in all its sections. Among its new products was the encephalograph and wave analyser for hospital use, and high-frequency oscillators for industrial use. The Hotpoint Electric Appliance Co. had made considerable progress under difficult conditions.

During the year the group had acquired a controlling interest in Premier Electric Heaters, Ltd. They had also acquired from the International General Electric Co. of America, the International Refrigerator Co., Ltd., of Great Britain. Negotiations had been completed for the purchase of the Victor X-Ray Corporation, also from the International General Electric Co. It was intended that the X-ray interests of M.-V., Newton & Wright, and Victor X-Ray should be amalgamated. Aldermaston Court was being converted into a central research station at which only long-term fundamental research would be undertaken. Both the M.-V. and the B.T.H. Companies had maintained their leading position in the field of research into atomic energy.

Ever Ready Co. (Great Britain), Ltd.—Subject to final audit the profits for the year ended March 31st last are given as £531,968, compared with £651,019 for 1945-46. The dividend on the ordinary stock is maintained at 40 per cent by a final payment of 25 per cent. Last year there was also a victory bonus of 5 per cent, not subject to tax, out of capital profit on the sale of a shareholding in an associated company.

Venner Time Switches, Ltd.—Helbert, Wagg & Co., Ltd., announce that in connection with the issue of 432,000 ordinary shares of 5s. each recently offered to stockholders at 9s. per share in the proportion of one new share for every 5s. stock unit held, acceptances have been received in respect of 90 per cent of the shares offered.

The Telegraph Condenser Co., Ltd., from a net profit of £41,495, after providing £43,000 for income tax, is raising its dividend from 7½ per cent to 10 per cent and paying a bonus of 5 per cent (same.) The profit for 1945, after providing £34,159 for tax, was £34,495. General reserve receives £25,000 (against £18,800) and £40,232 (£40,402) is carried forward.

The Calcutta Electric Supply Corporation, Ltd., has again declared a final dividend of 3 per cent, free of tax, making 6 per cent, free of tax.

Holophane, Ltd., is paying an interim dividend of 7½ per cent; last year a first and final dividend of 12½ per cent was paid.

Heatrae, Ltd., is maintaining its dividend for the year at 12½ per cent.

New Companies

M.E.M., Ltd.—Registered April 22nd. Capital, £100. Manufacturers of electrical appliances and fittings, mechanical and electrical engineers, pottery and electrical porcelain and insulation manufacturers, etc. Directors: W. L. Barber, E. Withington, A. Wynn, W. J. Barber, R. W. S. Mackay and A. T. Hesmondhalgh. Regd. office: M. E. M. Works, Tyseley, Birmingham.

Newman & Anderson (Electrical Engineers), Ltd.—Registered April 15th. Capital, £12,000. Directors: A. Anderson, E. A. Anderson, W. Coates, and H. C. Peek. Regd. office: 45, Nottingham Place, W.1.

Multiscan Corporation, Ltd.—Registered April 16th. Capital, £10,000. Electricians, electrical, radio and television, mechanical and motor engineers, etc. Directors: Earl Lloyd George, W. B. Goodwin, and T. P. S. Hoodless. Regd. office: 36, Dorset Street, W.1.

Leake & Hickmott, Ltd.—Registered April 18th. Capital, £5,000. Electrical engineers, etc. Directors: W. K. Leake and D. J. W. Hickmott. Regd. office: 63, High Street, Sidcup, Kent.

Liquidations

Oerlikon, Ltd.—Winding up voluntarily (for reconstruction purposes). Liquidator, Mr. K. F. Steven, Pinners Hall, Austin Friars, London.

Temco, Ltd.—Winding up voluntarily for reconstruction purposes. Joint liquidators, Mr. B. H. Musgrave, 22, Old Broad Street, London, E.C.2, and Mr. H. W. Smith, The Cell, Monmouth.

Bankruptcies

F. R. A. Lock and V. C. Lock, carrying on business at Union Street, Stourbridge, electrical engineers.—Last day for receiving proofs for dividend May 10th. Trustee, Mr. A. V. Hooper, 1, Priory Street, Dudley, Official Receiver.

F. R. A. Lock (separate application).—This debtor applied for discharge recently at the Court House, Hagley Street, Stourbridge, when he offered £100 towards the payment of the liabilities. The discharge was granted subject to confirmation of the offer by the Official Receiver.

J. Wilson, carrying on business at 81, Bradford Road, Riddlesden, Keighley, electrical engineer.—Receiving order made April 22nd on debtor's own petition.

E. Ramsey, Springfield Place, Hunslet Carr, Leeds, electrical engineer.—Last day for receiving proofs for dividend, May 13th. Trustee, Mr. G. F. Morris, 29, East Parade, Leeds, Official Receiver.

H. Savory, carrying on business at 7a, Hill Street, Shaw, electrical engineer.—Supplemental dividend of 3s. 11½d. in the £, payable May 20th at the Official Receiver's office, 20, Byrom Street, Manchester.

STOCKS AND SHARES

THE effects of the Budget on the Stock Exchange may be said to have almost worn off. There remains, and must remain for some time to come, the uncertainty in regard to the manner in which the raising of the profits tax will affect dividends. Investment, however, is disposed to ignore this consideration, more especially as dividend announcements continue to be distinctly satisfactory, and company directors are taking a cheerful view of the outlook. A minor feature of the past few days was a sharp rise in Imperial Chemical Industries. The company recently increased its dividend from 8 to 10 per cent. Manufacturing and equipment shares move somewhat irregularly, but money continues to flow into this market. Another significant indication of the manner in which capital is settling down after the Budget apprehensions, is a revival of demand for good-class preference shares.

Market Movements

Of the price changes recorded during the past week in the industrial markets, the majority have been in favour of shareholders. Among electrical equipment issues, General Electrics are 1s. 3d. better at 97s. and A.E.I., assisted by the annual meeting, have added 3s. to 85s. 6d. Chloride Electrical, at 4¾, have gained half-a-crown. Johnson & Phillips, at 83s. 9d., are prominently strong. Telegraph Constructions have been well maintained at 56s. 3d. since the meeting, but Enfield Cables, at 45s., remain on the dull side. Radio & Television (formerly Philco) relapsed to 7s. on the company's decision to defer consideration of the due preference dividend, until the accounts for the year ended in March are available. Otherwise, radio shares show a better tendency, with Pye deferred 2s. 6d. up at 30s., Cossors 6d. harder at 31s. and Decca 1/16 higher at 57s. 6d. Tube Investments, at 6⅛, have advanced 2s. 6d. Higher prices rule for International Combustions, at 3 1/16, Hopkinsons 5⅛, Crabtree 45s. 6d., Revo 51s. 3d. and Reyrolle £4.

Communication Stocks

The dramatic rise in Cable & Wireless ordinary stock halted when the price reached 180, from which a reaction occurred to 175½, leaving a gain of 2 points on the week. Eastern Telegraph 3½ per cent preference touched 140 before reacting to 135. This goes against 112 a month ago. The recent buying was due to vague expectations of a high repayment price. Globe Telegraph & Trust ordinary sympathized with these improvements with a rise of 2s. to 50s., the preference gaining 1s. 9d. at 35s. 6d. Anglo-American Telegraph preferred at 138 is 2 points higher. Oriental Telephones have revived and at 57s. 6d. are 2s. 6d. higher on the week. Telephone Manufacturing remain at 14s. 3d. The company is offering its shareholders two new 5s. shares at 10s. for every seven shares now held. Canadian Marconi at 13s. 9d. are 1s. 3d. higher: Marconi Marine at 34s. 6d. have lost 1s.

Vickers and the Bonus Tax

Vickers 10s. units have been associated particularly with capital bonus possibilities since last year's annual meeting, at which the chairman discussed the question of restoring the units to their original value of £1 on the removal of the ban on capital issues. As it happened, Vickers' preliminary report and dividend followed, within a few days, the Budget provision for the relaxation of the ban, but the simultaneous imposition of a 10 per cent duty on the "bonus element" in such transactions removed in advance the hope of Vickers' capital being written up on the scale contemplated. Disappointment was compensated in part by the increase in the year's dividend by 2½ per cent to 12½ per cent, but the price of the units came back from 34s. to 32s. 6d.

Electricity Bill

In its original form, the Electricity Bill provided that dividends payable by an electricity supply company during the interval up to the vesting date should be restricted to the rate paid for the last financial year, or to 4 per cent, whichever was the higher. An assurance has now been given of an amendment to cover the contingency that, if revenue falls short of the amount required to make such a distribution, the company concerned may draw on reserves for the purpose of maintaining it. Another slight concession was the Minister's undertaking to reconsider the obligation placed by the Bill on directors, "jointly and severally", to refund any excess dividend paid before the vesting date.

Compensation Stock

At the annual meeting of Electrical Distribution of Yorkshire, the chairman raised a point of general interest with his speculations about the future value of the Government security to be issued as compensation for electricity stocks. In doing so, he gave public expression to something that is causing a good deal of uneasiness in the minds of stockholders. Mr. Wickham foresees the possibility of a substantial amount of selling of the compensation stock, and perhaps a dearth of buyers. In that event, he adds, a seller might get something much less than his £100 per cent. Considerations such as these are probably responsible, in part, for the persistent quotation of electricity supply shares at figures well below the estimated "take-over" prices. Yorkshire Electrics are 6d. up at 49s. and North Eastern Electrics 6d. down at 35s. These are the only changes in the Home group since a week ago. Amongst Overseas issues, Tokyo sixes are 9 points higher at 66½ on speculative hopes. Victoria Falls have hardened to 6 5/16, and Calcutta Electrics to 51s. 3d. At 53s. 6d. Calcutta Trams are 3s. 6d. up.

Nationalization in France

Structure of the Electricity Service

NOW that the Electricity Bill is under consideration in the House of Commons it is appropriate to outline the system which has been adopted in the nationalization of electricity supply in France.

The management of the industry has been delegated to public bodies whose organization, administration and inspection is subject to rules differing slightly from those governing other public works. An organization called Electricité de France exercises general management of the industry; it comprises six sections which study, create and exploit the means of electricity production. Distribution has been delegated to public bodies called Service de Distribution.

These are governed by administrative committees composed of representatives of the different interests involved: the State, consumers and personnel. The administrative committee of the National Service comprises six representatives of the State nominated by the appropriate Ministries; six consumers' representatives, including one from the principal consuming industries and one representative of agricultural associations; and six representatives of personnel. Each distribution service is administered by a committee appointed by the National Service, and comprising four members representing the National Service, six representatives of the different categories of personnel and three consumers' representatives. A director-general nominated by the Cabinet heads the National Service and is chosen from competent professional men. Directors of the services and distribution are appointed by the administrative committees of the services subject to agreement by the National Service.

Control of Authorities

Very strict control of Electricité de France is provided for. Commissaires are designated by the Minister of Finance, and their reports are published in the *Journal Officiel*, where they deal with the National Service and in local law papers for the other services. In addition there has been created an auditing body to examine each year the accounts and reports of the Administrative Committees. This body is completely independent and holds the administrators responsible in the same way as for a limited company. They can be recalled at any time for mismanagement and their policy can be questioned in Parliament.

These controlling measures are held to provide greater flexibility than is usual in publicly owned utilities. There is less tutelage, and notably in the matter of accounts, the methods are those in practice in commerce and industry. It is hoped that the functioning of Electricité de France will avoid deficits which would require subsidies damaging to French economy and also lead to demands for the reversal of nationalization.

Electricity in the Home

Importance of Labour-Saving Devices

WHEN invited to read a paper before the Royal Society of Arts in London on the uses of electricity in the home, Miss C. HASLETT (E.A.W.) chose to relate her subject to the two-fold national need to make the most efficient use of available energy, and to recruit more women into industry.

Thus the paper begins by indicating how the intelligent use of electricity in the home will enable women to devote more time to other activities inside and outside the home. Restriction of the uses of electricity during the recent fuel crisis had proved how wrong it was to regard electricity as a luxury, or extra.

It was necessary to differentiate between the use of electricity to fulfil the normal functions of a fuel, and its employment for labour-saving household appliances. That differentiation was of great significance to-day and any arbitrary decision to restrict the manufacture of such appliances in an effort to reduce the consumption of electricity would have implications far beyond the actual saving of fuel made in that way. No one would suggest a permanent ban on the use of power-driven machinery in industry. Women could enter industry in sufficient numbers only if they were provided with labour-saving homes and ancillary services.

Miss Haslett then proceeded to quote figures in answer to the question whether this country could afford not to produce electricity for domestic use. She maintained that the housewife should have free choice of the purposes for which she used electricity. She only was capable of deciding which of the services offered were most relevant to the special needs and tastes of her family: which were the ones she would be prepared to reduce or dispense with (for example, cooker or refrigerator, water or space heating) under pressure of over-riding need for economy. The choice, if imposed by restriction of national supply of coal, should not be further complicated artificially by non-provision of adequate basic installations in new and converted buildings, or by artificial limitation of the supply of apparatus.

Volk's Railway, Brighton

THE Brighton Transport Committee is recommending the restoration of Volk's Electric Railway, the 1½-mile track on the eastern sea front, which was closed down in 1940. The general manager and engineer (Mr. Winston Robinson) points out in a report that the rail is a special 40-lb section manufactured in Belgium and unobtainable in this country. Failing any suitable substitute, it is proposed to endeavour to import the rail. The motors, also, are of Belgian origin and replacements or spares will need to be imported or substituted by other equipment. It is estimated that the restoration work will cost £10,450.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Ashton-under-Lyne. — May 19th. Housing Committee. Electrical wiring in 54 permanent houses. (See this issue.)

Birkenhead.—May 13th. Electricity Department. Cables, meters and general stores for 12 months from July 1st, 1947. (April 25th.)

May 24th. Three-phase 6·6-kV reactor. (See this issue.)

Blackpool.—May 19th. Electricity Department. Transformers and cables. (April 18th.)

Edinburgh.—The closing date for the receipt of tenders for the control and indication equipment advertised in our issue of March 28th has been extended from April 25th to May 23rd.

India.—MADRAS.—June 19th. Government Electricity Department. 11 kV and lower voltage switchgear and accessories. (See this issue.)

Liverpool.—May 14th. Electric Supply Department. Transformers. (April 25th.)

Manchester.—May 20th. Electricity Committee. Static transformers for a two-year period. (See this issue.) Ventilating plant in turbine and boiler houses at Stuart Street power station. (April 25th.)

South Africa.—PRETORIA.—July 1st. City Council. Electric travelling cranes. (See this issue.)

Willesden.—Corporation. May 19th. Electrical installations in 44 houses and 12 flats. (April 25th.)

Orders Placed

Farnworth.—Electricity Department. Recommended. Cables (£6,307).—Edison Swan Cables. Pillar boxes and underground boxes (£483).—W. Lucy & Co.

Ilford.—Corporation.—Recommended. Four 500-kVA, 6,600/433-V transformers (£638 each). —British Electric Transformer Co. Two ditto (£638 each).—Ferranti. Cables (£14,209).—Metropolitan Cable & Construction Co.

London.—Joint Electricity Authority. Accepted. E.h.v. switchgear for Esher substation. —Crompton Parkinson.

Stockton-on-Tees.—Town Council. Accepted. Equipment for substations in Durham Road, Green Lane and Hartburn:—Switchgear.—A. Reyrolle & Co. L.v. switchboard.—W. Lucy & Co. Transformers.—C. A. Parsons & Co. Cables for the Green Lane housing estate and Hartburn substation schemes (£4,284). —Edison Swan Cables.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Accrington.—Aged persons' dwellings (154), on seven sites; H. Sanderson, borough engineer.

Atherstone (Warwicks.).—Houses (£32,644), Boot Hill, Baddesley Ensor; R.D.C. surveyor, 102, Long Street.

Blaydon-on-Tyne.—Factory for North British Plastics, Britannic Works; R. C. Williamson, builder, Rowlands Gill, Co. Durham.

Blyth.—Factory for Morphy Richards & Co.; H. E. Pitt, Ltd., Leopold Street, Millfield, Sunderland.

Bournemouth.—Factory premises, 80-81, Wolverton Road, Boscombe; F. D. Lawton, 42a, Gloucester Road, Boscombe.

Brackley.—Houses (38), Middleton Cheney, for R.D.C.; G. Forsyth Lawson, architect, 25a, High Street, Banbury.

Brentwood.—Houses (100), Three Arch Bridge site (£113,639), for U.D.C.; A. E. Symes, Ltd., contractors, Ongar Road.

Bromley.—Flats (54), London Road, etc., for T.C.; Dagleish & Pullen, 17, Fitzhardinge Street, Portman Square, W.1.

Cardiff.—Additions (200 beds), at Llandough Hospital; Sir Percy Thomas, architect to the Cardiff Royal Infirmary.

Carnforth.—Nursery School, Kellet Road, for Lancashire E.C.; G. Noel Hill, county architect, Preston.

Colne.—Houses (42), Haggot Gate estate; borough engineer.

Dudley.—Clothing factory; Grainger & Smith, Ltd., King Street.

Ealing.—Factory premises, Oldfield Lane, for Garners, Ltd., 6, Sevenex Parade, London Road, Wembley; McGlashan, surveyors, High Road, Wembley.

Easington.—Juvenile training centre at the miners' hostel; W. Tomlin & Son, North Dene Avenue, Seaham.

Elgin.—Houses (120), for naval personnel; the Admiralty.

Exeter.—Erection of biological building at Prince of Wales Road, for University College Council; A. K. Woodbridge, registrar of the college, Gandy Street.

Featherstone.—Houses (100) for U.D.C.; W. H. Young (Ackworth), Ltd., builders, Ackworth.

Fife.—Weir houses (150), Comrie; county architect, County Buildings, Cupar.

Gateshead.—Domestic science centre at Oakwellgate School for the E.C.; H. J. Cooke, chief architect, Municipal Buildings.

Glasgow.—Six-storey building in Argyle Street for F. W. Woolworth & Co., Ltd.; the manager.

Seven-storey building in Union Street and Argyle Street for office accommodation; Montague Burton, Ltd.

Hatfield.—School buildings on Old Rectory estate; county architect, County Hall, Hertford.

Hexham.—Houses (35); U.D.C. surveyor.

Heywood.—Houses (40), Yew Mill, for T.C.; J. Berry, Ltd., contractors, Chapel Street.

Horsham.—Houses (186) for R.D.C.; A. W. Laidman, clerk, Comewell House.

Hull.—R. C. Church, Bilton Grange estate; priest-in-charge.

Works extensions, Salt End (£2,000,000); British Industrial Solvents, Ltd. (Distillers Co.)

Lanchester.—Houses (52), at Langley Park and Burnhope; R.D.C. surveyor.

Leeds.—Semi-detached houses (32); E. Harrison, builder, Holme Grove, Burley-in-Wharfedale.

Marfleet.—Factory; Humber Oil Co., Ltd., Burton Street, Hull.

Middlesbrough.—Factory, Grey Street, for G. N. Poskitt; Garbutt, Archibald& Archibald, architects, Albert Road.

Reconstruction of works for R. W. Rundle & Co. Smeaton Street.

Middlewich.—Brick houses (32); R. J. B. Wilkinson, U.D.C. surveyor, Victoria Buildings.

Newcastle-on-Tyne.—Warehouse, Hume Street, for Stevenberg & Son; Marshall & Tweedy, architects, Grainger House, Blackett Street.

Military centre including garage for several hundred vehicles, and quarters for staff; Northumberland Territorial Association, Sandyford Road, Jesmond, Newcastle-on-Tyne.

Cinema, dance hall, café and shops, Benton Road, for the Benton Lodge Estate Co.; Stephenson & Gillis, architects, 2, Saville Place.

Extensions to works, J. W. Hindson & Sons, Ltd., printers, Melbourne Street; Thomas Clements & Son, Selborne Gardens, Jesmond, Newcastle-on-Tyne.

Poole.—Factory for Carbex Manufacturing Co., Alder Road.

Preston.—Houses (30), Station Road, New Longton; R.D.C. surveyor, Guildhall Street.

Sandwich (Kent).—Extensions, Stonar premises (£24,000); The National Coal Board.

Watford.—Permanent houses (72), Hazelwood Lane, Abbots Langley; R.D.C. surveyor, 25, King Street.

Wellingborough.—Extensions to Croyland Road School for Northants E.C. (£15,650); J. Perkins, county architect, Northampton.

Wigan.—Houses (64) for R.D.C.; surveyor, Bank Chambers, Wallgate.

Worthing.—Houses (78), Tower Road, Lancing (£104,284); surveyor, Rural Council Offices.

York.—Houses (94), Water Lane (£109,842); Sorrell (York), Ltd., St. George's Place.

Next Week's Events

Monday, May 5th to Friday, May 16th.—LONDON (Earls Court and Olympia) and BIRMINGHAM (Castle Bromwich) British Industries Fair.

Monday, May 5th.—BIRMINGHAM.—James Watt Memorial Institute, Gt. Charles Street, 6 p.m. I.E.E. South Midland Centre. "Industrial Applications of Electrical Techniques," by H. A. Thomas.

Tuesday, May 6th.—MANCHESTER.—Engineers' Club, Albert Square, 6 p.m. I.E.E. North-Western Centre. Annual general meeting. "The Teaching of the Principles of Electrical Machine Design," by L. H. A. Carr.

LEEDS.—Corporation Electricity Department, Whitehall Road, 6 p.m. I.E.E. North Midland Centre. Annual general meeting.

Wednesday, May 7th.—LONDON.—Institution of Electrical Engineers, Radio Section, 5.30 p.m. "Accurate Measurement of the Group Velocity of Radio Waves in the Atmosphere, using Radar Technique," by R. A. Smith, E. Franklin and F. B. Whiting.

SOUTHAMPTON.—University College, 7 p.m. I.E.E. Southern Centre. "The Development of the Gas-Cushion Cable System for the Highest Voltages," by T. R. P. Harrison.

Thursday, May 8th.—LONDON.—Institution of Electrical Engineers, Installations Section, 5.30 p.m. "Special Electrical Requirements of a Viscose Rayon Factory," by C. F. Freeman and H. V. Mather.

MANCHESTER.—Engineers' Club, Albert Square, 6.30 p.m. Women's Engineering Society (Manchester Branch). "Capacitors—their Manufacture and Testing," by Miss W. Hackett.

Friday, May 9th.—LONDON.—At the Institution of Electrical Engineers, Savoy Place, W.C.2, 6 p.m. The Television Society. "Television Picture Quality," by C. L. Hirshman.

LONDON.—St. Stephen's Tavern, Westminster, S.W.1, 6.30 p.m. Meter Engineers' Group (Southern Division), Electrical Power Engineers' Association. Open discussion.

BIRMINGHAM.—Imperial Hotel, Temple Street, 6 p.m. Illuminating Engineering Society (Birmingham Centre). "The Physical Nature of Light," by H. J. Cull.

Saturday, May 10th.—LONDON.—Institution of Electrical Engineers, London Students' Section, 2.30 p.m. Visit to the B.B.C., Alexandra Palace, N.22.